CHEMICAL LIBRARY

MAY 25 1927

The First and Second Ballots on Headquarters Site Have Been Recorded—the Next Vote Is to Be Taken June 1st. Everyone Entitled to a Voice in the Matter Should Exercise This Privilege.

Vol. XVI, No. 5 MAY, 1927

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

CONTENTS

Frontispiece and Sketch—Wilford Harrison 393
Editorial:
The Seventy-Fifth Annual Meeting of the American Pharmaceutical Association in St. Louis 395
Progress Lies in the Coöperative Coördinated Efforts of All Divisions of the Drug Trade and Pharmacy 395
Scientific Section:
A Study of Ephedra Nevadensis—Terry 397
Examination of Asarum Caudatum—Burlage and Lynn 407
A Study of the Stability of Physostigmine Solutions—Krantz, Jr., and Slama 412
The Effect of Gelatin on Titration Curves of Various Acids—Little 414
A Modified Calvert Test for Diethylphthalate—Scott and Will 417
A Revision of the Pentanols—Gordon (*Concluded*) 419
Some Applications of Colloidal Chemistry to Pharmacy—Broady and Jordan 425
Bibliography of Pharmaceutical Research—DuMez 431
A Pharmaceutical Study of Syrup of Ferrous Iodide (1840–1927)—Braford and Langenhan (*Continued*) 433
Pharmaceutical Events in 1776—Raubenheimer 437
"Stop, Look, Listen"—Lloyd 440
Our Problems—Dworkin 444
Department of Business Management:
Comments, Questions and Suggestions Are Invited and Welcome 448
How Much Should a Retail Druggist Spend for Advertising? 448
A Monthly Calendar with Real Selling Value 449
The Department of the National Association of Boards of Pharmacy:
District Meetings 451
Legislative News 452
State Board of Pharmacy News Items 452
A Plea for the Adoption of the Quarterly System by Colleges of Pharmacy—Bliss, Jr 454
Fortifying the Prescription Counter—Stocking 461
The Department of the American Association of Colleges of Pharmacy:
Content of Physiology Courses Given at the New Jersey College of Pharmacy—Riggs 463
Proceedings of the Local Branches 467
Association Business 471
A Half Century of the National Formulary 1880–1930—Langenhan (*Continued*) 474
Editorial Notes 482
Personal and New Items 485
Societies and Colleges 488
The Pharmacist and the Law 492
Book Notices and Reviews 495
Advertising—Cover Pages 2, 3 and 4 and pp. I–XXII.

Published Monthly by the American Pharmaceutical Association: Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase Street, Baltimore, Md.

Annual Subscription, $4.00; Single Numbers 35 Cents.

THE SEVENTY-FIFTH ANNUAL CONVENTION—THE DIAMOND ANNIVERSARY MEETING—WILL BE HELD IN ST. LOUIS DURING THE WEEK OF AUGUST 22.

The 1927 Meetings of the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy will also meet in St. Louis, same time and place.

For Association Roster and Roster of the Boards of Pharmacy, see pages x, xii, xiv and xvi.

For Roster of Officers of Pharmaceutical Assoc.—State and National, see pages xix, xx and xxi.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

MARINOL

The Mineral elements of seaweed and sea water with Cod Liver Oil of verified vitamin potency.

8 oz. Bottles—$8.00 per dozen
2 oz. Trial size to retail at 35 cents each.

FAIRCHILD BROS. & FOSTER **New York**

Display the Sign
of the
Prescription
Pharmacy

Atophan

TRADE MARK
Reg. U. S. Pat. Off.

Our Annual Nation-Wide Atophan Campaign Is Under Way

At this time, every member of the medical and allied professions, every hospital, sanitarium and public institution, receives a complimentary trial package of ATOPHAN and the latest advertising matter.

As usual, this is supplemented by sustained advertising in the professional press and by detail work.

Your cash register now proclaims the steady all-year-round, brisk demand for ATOPHAN, the premier remedy in Rheumatism, Gout, Neuralgia, Neuritis, Sciatica, etc.

The present campaign will undoubtedly run true to form and bring further increased sales.

Please Look to Your Stock

"Your Wholesaler Will Promptly Supply You."

SCHERING & GLATZ, Inc.,

84–92 Orange Street,
BLOOMFIELD, N. J.

41–43 Maiden Lane,
NEW YORK, N. Y.

AMERICAN PHARMACEUTICAL ASSOCIATION COMMITTEE ON RESEARCH.

The AMERICAN PHARMACEUTICAL ASSOCIATION has available a sum amounting to $500.00 which will be expended after October 1, 1927, for the encouragement of research.

Investigators desiring financial aid in their work will communicate before July 1st with H. V. Arny, Chairman, A. PH. A. Research Committee, 115 West 68th St., New York, N. Y., giving their past record and outlining the particular line of work for which the grant is desired.

CONTRIBUTIONS TO THE MUSEUM AND LIBRARY OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Friends and members of the AMERICAN PHARMACEUTICAL ASSOCIATION who contemplate giving or bequeathing books, manuscripts and articles of historical value are respectfully asked to enclose them in boxes or packages and mark them "for the AMERICAN PHARMACEUTICAL ASSOCIATION" and forward them to the Historian, 10 West Chase Street, Baltimore. This is in accord with a vote of the Section on Historical Pharmacy, at the recent Philadelphia meeting. Due acknowledgment will be made. The time to give this matter attention is "as soon as possible"—otherwise, the request may be forgotten.—Thank you!

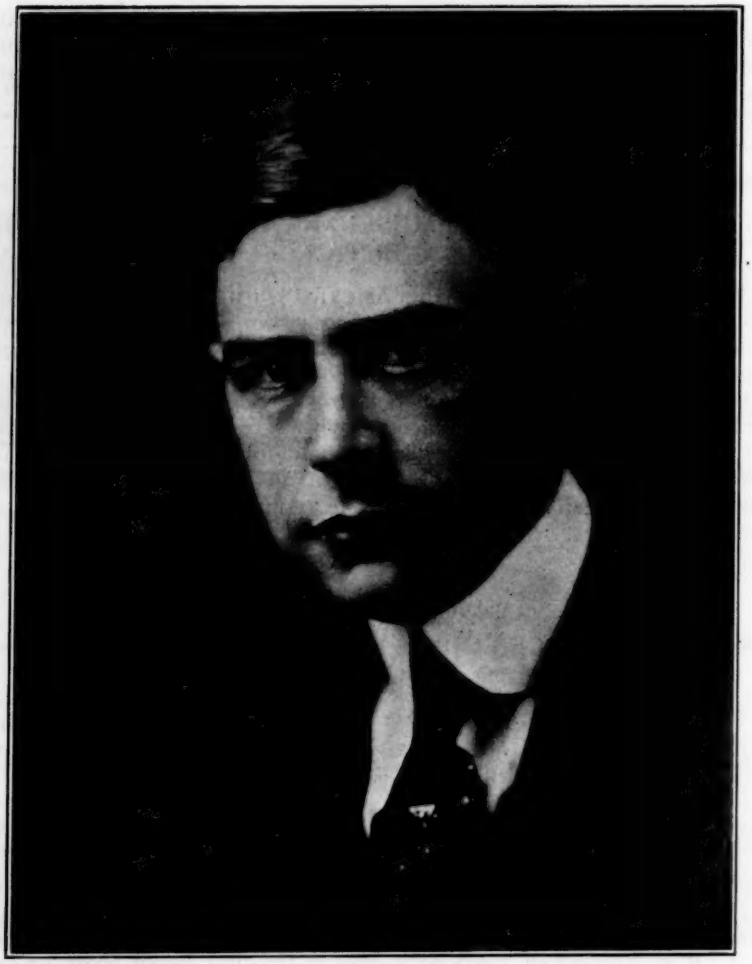
RESULT OF THE SECOND BALLOT ON THE A. PH. A. HEADQUARTERS.

Secretary E. F. Kelly has announced the result of the second ballot on the A. PH. A. Headquarters site. The following cities have received the highest vote in the order named:

Washington, D. C.
Chicago, Ill.

The names of these cities will appear on the ballots which will be sent out on June first, and the one receiving the greater number of votes in this ballot will be the chosen city for the A. PH. A. Headquarters.

A larger number of votes were cast in the first ballot than for any other prior project of the AMERICAN PHARMACEUTICAL ASSOCIATION. The vote just completed exceeds the former. A ballot representing 100% is improbable, but it is to be hoped that 90 per cent of the membership will exercise their privilege and duty in the final vote. Vote on the day that the next ballot reaches you!



WILFORD HARRISON.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XVI MAY, 1927 No. 5

WILFORD HARRISON.

THE presiding officer of the National Association of Boards of Pharmacy is a native of the Lone Star State. President Wilford Harrison was born at Cooper, October 18, 1889, and here he received his earlier education, completing high school in 1905; thereafter, he attended the Polytechnic College at Fort Worth, until 1908, when he matriculated in the Pharmacy Department of Fort Worth Medical College, graduating in 1910. Since then Mr. Harrison has been continuously connected with some branch of the drug trade and pharmacy—as pharmacist for E. S. Morris & Co., Wichita Falls, until 1913, when he joined the sales force of H. W. Williams & Co., wholesale druggists of Fort Worth; and in 1919 he purchased the business of his former employers—E. S. Morris & Co. This store and another one in Wichita Falls are owned by the President of the N. A. B. P.; they are among the largest and best-equipped retail establishments of the Southwest and in them the scientific work of pharmacy is featured in large, well-equipped prescription departments.

For many years, in fact since its establishment, the pharmacy department of the University of Texas at Galveston had been a part of the medical department and was under the direction of the dean of the medical department. Recently, Mr. Harrison appeared before the regents of the university and succeeded in having the pharmacy department separated from the medical department and Dr. W. F. Gidley of the former was elected its dean. This permitted the State University College of Pharmacy to become a member of the National Association of Colleges of Pharmacy. He is a firm believer in trade and professional associations; besides being a member of the N. A. B. P., he holds membership in the AMERICAN PHARMACEUTICAL ASSOCIATION, the National Association of Retail Druggists and the Texas Pharmaceutical Association.

The subject of this brief sketch is active in the organizations of the drug trade and of pharmacy and takes a lively interest in civic affairs for the advancement of his thriving home city and State.

RESOLUTIONS OF THE COMMITTEE ON REVISION OF THE NATIONAL FORMULARY

IN MEMORY OF DR. HERMANN ENGELHARDT

WHEREAS the sudden death of Hermann Engelhardt has removed from our Committee one of its most respected and capable members, who has always served willingly and effectively,

Be It Resolved by the COMMITTEE ON REVISION OF THE NATIONAL FORMULARY of the AMERICAN PHARMACEUTICAL ASSOCIATION that, through the death of Hermann Engelhardt, this Committee has lost one of its most valuable members, a man, not only keenly interested in the work of the Committee and thoroughly well equipped and capable of solving the problems submitted to him, but one of fine quality, high ideals, friendly and magnetic personality. His scientific training, keen understanding and coöperative spirit were of great service to our Committee, therefore

Be It Further Resolved that the Chairman of the COMMITTEE ON REVISION OF THE NATIONAL FORMULARY be instructed to send a copy of these resolutions, together with an expression of our deep sympathy, to Mrs. Engelhardt, a copy to the editor of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, and file a copy in the records of the COMMITTEE ON REVISION OF THE NATIONAL FORMULARY.

THE COMMITTEE ON REVISION
OF THE NATIONAL FORMULARY

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

THE SEVENTY-FIFTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION IN ST. LOUIS.

THE Diamond Anniversary meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION will open in St. Louis August 22nd, at Hotel Coronado—*about three months from now.* This means that the Section Officers should prepare for the programs of their respective sections. Doubtless, the officers have solicited papers and some contributions have been received, but the time has come for sending out another letter for additional papers.

The titles of papers should be mailed to Secretary E. F. Kelly, 10 West Chase Street, Baltimore, Md., prior to July 1st, so there may be no delay in preparing the Convention program.

Copies of papers may be sent to the office of the JOURNAL at any time by contributors—this may serve as a safeguard against loss.

The names of Section Officers, of Members of Committees, etc., will be found in the roster, printed in the Advertising Section.

The final ballot on the site for the A. PH. A. Headquarters will go out to the members June 1st; hence, the selection will be known soon after the first of July. It is hoped that every member entitled to vote will exercise his privilege; the number of votes cast in the second ballot exceeded that of the first; let the final vote be even a more representative ballot.—E. G. E.

PROGRESS LIES IN THE COÖPERATIVE COÖRDINATED EFFORTS OF ALL DIVISIONS OF THE DRUG TRADE AND PHARMACY.

THE AMERICAN PHARMACEUTICAL ASSOCIATION was organized 75 years ago so that it might render service to all engaged in the divisions of the drug trade and pharmacy and thereby share in the larger service of these divisions in behalf of the community, State and Nation, and add to the common fund of knowledge and contribute to the industrial development of the country and promotion of public health—the greatest good for the greatest number and striving for the greatest good for all.

The basic standard of pharmaceutical progress is in the employment and development of the energies of the individual pharmacists, and in the realization and exercise of their respective powers alone, or in coöperation with others or through a combination of single and collective activity. It follows that to the degree in which the individual pharmacists fail to develop their opportunities, to that extent the individuals and the interests of pharmacy and the drug trade are losers. The efforts to adapt educational facilities to the general system of coordinated and individual needs and endeavor are prompted by the desire of organizing the energies of all for the good of all. This is the spirit of the AMERICAN PHARMACEUTICAL ASSOCIATION; let us foster it.

In the writer's opinion, individual ownership of pharmacies by pharmacists, *i. e.*, at least to the extent that pharmacists are in authority, is best for pharmacy and the community. Such ownership brings out the best possible development of the fundamental qualities of personal responsibility, which tends to disappear as individual ownership dwindles; there often follow also unfair dealing and ever-growing continued employeeship. The combines boast of ownership of stock by employees and the general public, but this is not ownership of the kind which is best for pharmaceutical service.

If the problems and viewpoints of the divisions of the drug trade and of pharmacy are considered in a spirit of common interest practical solutions and adjustments will result. The divisions of the drug trade and of pharmacy must, perhaps, always have their own organizations, but all of them have problems and endeavors in common which can best be studied jointly within the AMERICAN PHARMACEUTICAL ASSOCIATION. They include not only matters professional but affairs concerned with all phases of the drug business and the industries promoted by both. The Headquarters will open greater possibilities and opportunities; let us study them.

There are research problems relating to standards, manufacture and business management in which all of the divisions mentioned are jointly interested, and attention should be given to them accordingly. There is frequent duplication of work in the activities of several organizations in their respective scientific sections, and the results of these investigations sometimes require adjustment by conference.

Misunderstanding of commercial problems may be changed to helpful plans by seeking out wherein greatest good may be brought about for all. The chain store presents not only a problem for the retailer to cope with but also for the manufacturer and wholesaler—the combines compete with all of them. The wholesaler, as the retailer, may establish chain stores, but in doing so he changes his functions so materially that he, in a degree, severs his trade relations. Business, in order to serve the public best, requires the stimulating influence of competition, but combines cease to be attractive ventures unless they produce profit and then follow the schemes which are the trouble-makers of the present day. Let us seek out our common problems and use them as stepping-stones leading to coördinated coöperation.—E. G. E.

Everyone entitled to a vote on the A. Ph. A. Headquarters should exhibit an interest in the selection of the site.

Vote promptly—delay may cause you to overlook this important matter.

The Diamond Anniversary Meeting will be held in St. Louis during the week of August 22nd. Hotel Coronado will be Headquarters.

SCIENTIFIC SECTION

A STUDY OF EPHEDRA NEVADENSIS.*

BY RALPH E. TERRY.

CHAPTER I.

INTRODUCTION.

Purpose of the Study.—From time to time, specimens of *Ephedra nevadensis*, known as "Mexican Tea," have been submitted for analysis. A study of the available literature indicates that there is some question as to the active constituents of this drug. This research was undertaken to determine the constituents and the therapeutic properties of the plant *Ephedra nevadensis*, so that they might be more clearly understood and made available.

Botanical Classification of Ephedra.—The genus *Ephedra*, Family *Gnetaceæ*, may be divided into three geographical groups as follows:

1. *The Asiatic Group.*—This group consists of *Ephedra vulgaris* and its varieties, and *Ephedra distachya.*

2. *The European Plani.*—This is chiefly the variety helvetica of *Ephedra vulgaris.*

3. *The American Group.*—Some six species of Ephedra have been described as native of North America: five of these are mentioned as found in the California area (1). The six species are:

(*a*) *E. californica*, Watson ("Proc. Am. Acad.," 14, 300, (1879)). Localities, Mohave Desert (Lone Willow Spring) and in Panamint Valley, Whitewater (Riverside County), Campo and Jacumba Hot Springs, San Diego County, Tia Juana.

(*b*) *E. nevadensis*, Watson (*Ibid.*, 298). Localities, general in the Mohave Desert in the Juniper belt, near Acton, Jacumba Hot Springs.

(*c*) *E. trifurca*, Torrey in Emory ("Pas. R. R. Rep.,"152 (1848)). Localities, said to be abundant along the Mohave River around Daggett.

(*d*) *E. viridis*, Coville ("Centr. Nat. Herb.," 4, 220 (1893)). Localities, Mt. Pines, Sespe Creek, Bear Valley, Cushenberry Springs, San Bernardino Mts.

(*e*) *E. Torreyana*, Watson (*Ibid.*, 299). Probably not in California.

(*f*) *E. antisyphiletica*, found in Texas and New Mexico.

These three geographical groups of Ephedra are distinct in that their active constituents differ greatly.

1. *Asiatic.*—Nagai (2) studied the *Ephedra vulgaris* found in Japan, and from it extracted an alkaloid which he named Ephedrine. This substance was studied by Kinnessuke from the pharmacologic standpoint. It was found that in lower animals an acceleration of the pulse, elevation of the rectal temperature, and dilation of the pupils of the eyes resulted from the administration of the alkaloid. If given in large enough doses, convulsions and even death resulted from the arrest of the heart and the respiratory muscles. When administered to man, Scriba found that a mydriatic action resulted. The dilation was accomplished in from forty to sixty minutes, and was without irritation. The effects persisted over a period of from five to twenty hours.

* A thesis presented to the Department of Chemistry, University of Southern California, in partial fulfilment of the requirements for the degree of Master of Science.

The therapeutics of this alkaloid have been studied recently by K. K. Chen and Carl F. Schmidt. A statement of their conclusions is as follows (3):

> It appears from the pharmacodynamic studies that ephedrine is of considerable value as a circulatory stimulant in surgical shock, as a bronchial dilator in asthma, as a mydriatic, and as an apparently specific remedy in Addison's disease.

Chen and Schmidt also found that ephedrine was capable of being absorbed from the gastro-intestinal tract without change, and that the solutions of the salts were very stable. From this data, it would seem that the alkaloid might be of definite value in medicine. The other Asiatic species, *Ephedra distachya*, yields an alkaloid unlike ephedrine in that it is not mydriatic nor poisonous. This plant is used in the treatment of gout and syphilis, which require none of the vaso-effects prominent in the ephedrine. By some persons, this alkaloid is thought to be an isomeric form of ephedrine. For this reason it has been named pseudo-ephedrine.

2. *European.*—The plant *Ephedra vulgaris*, variety *helvetica*, has been naturalized in the Mediterranean Basin, and is found in certain localities in Central Europe. This plant yields an alkaloid which is isomeric with ephedrine, and has been named pseudo-ephedrine by Merck (4). Ephedrine, Merck, is an article of commerce and is listed in current price lists.

3. *American.*—Very little data are available through literature concerning the constituents of the five or six species of *Ephedra* common in the Southwestern part of the United States. The presence of the tannin seems to be the basis for the use of the drug, for "Loew thinks that their virtues reside in a peculiar tannin(2)." Rothrock states that the filtrate of the aqueous solution proved the presence of tannin and tartaric acid. Pectin was also shown to be in the filtrate, since a jelly-like precipitate appeared when the alcohol was added. The tannin belongs to the glucosidal group, furnishing sugar on treatment with acids and various other compounds, and upon distillation (dry) pyrogallic and carbonic acids. This tannin splits into sugar and a red amorphous powder. This powder Dr. Loew considers quite a distinct body which he names ephedrine: to this he attributes (probably correctly) the remedial properties of the plant.

Chapter II.

HISTORICAL REVIEW.

There is a wealth of reference to the genus *Ephedra* in literature, but most of these are from the botanist's viewpoint. Perhaps the earliest mention of the medicinal value of *Ephedra* was made by Dr. Harvard in 1885, when he described the plants as "Popular remedies among Mexicans and frontiersmen in the treatment of syphilis and gonorrhœa, especially the latter. The decoction or infusion of the stems has an acid reaction and an astringent taste resembling that of tannin (5)."

It is the extended use by the Mexican people of the drug which led to this study. The drug is known as Popotillo (popé-a-tella) among them, but also called various names such as Mexican Tea (6), Mormon Tea (7), Caynote (2), Canutilo (2), Teamster's Tea and Squaw Tea (7) by the early white settlers of the desert regions. While it has a very astringent taste, it is said that those who become accustomed to it prefer an infusion of this plant to the beverage made from the leaves of *Thea sinensis*. The teamsters are said to have carried bundles of the shrub hung under their wagons, hence the name of Teamster's Tea.

It has been said that the Indians of Arizona used the drug *Ephedra* as a kidney remedy. They used it in the form of an infusion in doses of from one-half to two ounces. The action is said to be of a diuretic nature, greatly increasing the flow of urine.

CHAPTER III.

THE PHARMACOGNOSY OF EPHEDRA NEVADENSIS.

Habitat Description.—The plant is a small, shrub erect in habit, approximately

Fig. 1.—Mohave Desert. Darker colored plants in the foreground are *Ephedra nevadensis.*

Fig. 2.—Habit photograph of *Ephedra nevadensis.*

Fig. 3.—Habit photograph of clump of *Ephedra nevadensis.*

Fig. 4.—Habit photograph showing prostrate individual plant. *Ephedra nevadensis.*

50 to 90 centimeters in height, and has divergently spreading glaucous green, scabrous branches. Abrams continues describing it as follows (6):

> "....leaf-like scales in 2's, 3 to 6 mm. long, sheathing to about the middle, obtuse or tapering at the apex, mostly deciduous in age; staminate ament sessile with 4 to 6 parts of the bracts; fruiting bracts of 4 to 5 parts, round-ovate, sessile; fruit exserted, acutish at apex."
>
> "....characteristic of the lower part of the Juniper belt and the upper part of the Covillea belt of the desert regions, Upper and Lower Sonoran Zones: Nevada and Southern Utah southward through Arizona to Northern Mexico, and through the

Mohave and Colorado Deserts of California to Northern Lower California. Type: Pah Ute Mountains, altitude 5000 feet, and Carson City, Nevada."

The material used in the analysis made in this study was collected at the Eastern end of Cajon Pass, at a point about midway between the towns of Summit and Victorville, San Bernardino County, California. It was found growing in scattered colonies in the sandy soil of this area, and was intermingled with the Juniper and Joshua trees of this vicinity.

The method of collection consisted of simply pulling up the plants and spreading them out to air dry. In the commercial drug, the tips are usually cut into fine pieces approximately two to five centimeters in length by means of a drug cutter. The larger portions are removed by hand garbling.

Pharmacognostic Description.—**Macroscopical:** *Ephedra nevadensis* occurs in the market in the form of short cylindrical pieces, from 2 to 5 centimeters in length and from 1.5 to 4 millimeters in diameter. The most prominent of the external markings is the nodal portion, which consists of double opposite scars or adhering scale leaves. The internodal portions are finely longitudinally striate and are of peculiar roughened appearance usually associated with the members of the Carex group. The drug is of a light yellow-green color, and has a very fibrous fracture due to the large amount of bast in the cortex. The internal color is light brown for the cortex, and a deep red-brown for the pith area. The odor is slight, but rather aromatic, somewhat pine-like. The taste is aromatic and astringent.

The scale-like appendages are sometimes wanting, indicating that they do not function as the site of food production. On the other hand, the fact that the parenchyma cells are palisadal and radially arranged, and have numerous chloroplasts present, would indicate that, as is common in xerophytic plants, the functions of the leaves have been usurped by the stems.

Microscopical: In cross-section, the drug shows a single row of epidermal cells, square, and about 30 to 45 microns on a side. The outer walls consist of a very much thickened cuticle, rather even and about 25 microns in thickness. The cortex is made up of rectangular, palisade-like, parenchyma cells, 40 microns in width by 80 to 120 microns in length, and arranged radially. A number of small rounded bodies suggesting chloroplasts are still to be found in these cells. The parenchyma is somewhat loosely arranged, with air spaces showing beneath the stoma of the epidermis. The bast occur in three distinct rows, the outer being in contact with the epidermis, the middle being found about midway in the cortex, and the inner row at the cambium line. In the cross-section, the bast are circular or somewhat compressed, and show three or more distinct laminations. The lumen is rather small. From two to seven cells usually consitute a bundle, the members of which are arranged radially. The cambium area is made up of three to six rows of meristimatic tissue, the individual cells being rather small. No distinct cambium is visible. The xylem consists of radial rows of rectangular tracheids, in two or three rows for each bundle. The medullary rays are made up of radially elongated parenchyma, and are usually two cells in width. They extend to the cambium, or barely into the inner bark area. In this xylem area, two distinct rows of tracheal-like tubes were observed, these being at the position of the spring growth of the annular rings. Large rounded parenchyma cells from 100 to 200 microns make

up the pith. Some of these show chloroplast-like bodies, while others are filled with a brownish colored substance suggestive of phlobane nature by its reaction.

In cross-section, *Ephedra californica* presents much the same appearance, except that the cuticle is very wavy and is irregularly thickened. The parenchyma of the cortex is somewhat longer than in *Ephedra nevadensis*, being as high as 275 microns in length. The bast occur in bundles of from three to seven cells and are somewhat less in diameter. There are few vessel-like openings in the xylem area, and the medullary rays are slightly more prominent. The pith shows the same deposit of brownish material, but in this case, the chloroplast-like bodies are distinctly green. The wood has somewhat less in amount and does not show over two annular rings.

Powder Description.—The powder is of a light brown color, darkening somewhat with aging and exposure to light. Under the microscope, it consisted of very irregular fragments, none of distinct diagnostic value. The pith cells with their brownish material were occasionally present, and this substance itself occurred in irregular broken fragments throughout the mount. The bast occurred singly or in groups of twos, showing the very small luminæ and the tapering ends. They were fifty microns in diameter and from two hundred to eight hundred microns long. A number of shortened bast cells of the nature of stone cells were present, something like the stone cells of Prunus Virginiana. In all, the powder does not present a sufficiently distinctive feature to be used in identifying the drug.

In longitudinal section, the xylem may be separated into long tapering cells with spiral markings and shorter tracheids, with the characteristic bordered pores of the gymnosperms. Some of the spiral markings are of the nature of closely twisted strands, while others are more loosely twisted.

Drug Preparation.—In the grinding of *Ephedra nevadensis* the large amount of bast present in the cortex interfered greatly in obtaining a uniform powder. The following table indicates the method employed in preparing the drug for analysis for this study:

TABLE SHOWING THE RESULTS FROM PREPARING EPHEDRA BY THE BALL MILL, HAND MILL, AND GYRATOR MILL PROCESSES.

	Ball mill.	Hand mill.	Gyrator mill.
Amount of drug taken	125 Gm.	125 Gm.	25 Gm.
Weight of No. 60 or finer powder	80 Gm.	70 Gm.	18.6 Gm.
Per cent of powder	62	56	74.4
Weight of No. 20 to No. 60 powder	8 Gm.	20 Gm.	6.1 Gm.
Per cent of powder	6.2	16	24.4
Residue (gruffs)	35 Gm.	35 Gm.	0.3 Gm.
Per cent of residue	28	28	1.2

The lack of uniformity in results would seem to indicate that the preparation of the sample drug for analysis must be arranged so that it is uniform. Considerable care was here exercised to include representative portions of each of the three fractions of the whole drug.

CHAPTER IV.

CHEMICAL ASPECTS OF EPHEDRA NEVADENSIS.

Proximate Analysis.—Following the methods outlined under the Vegetable Drug Analysis section of the United States Pharmacopœia X (8), the following proximate analyses of *Ephedra nevadensis* were made:

1. Moisture
2. Total ash
3. Acid insoluble ash
4. Crude fiber
5. Ether soluble extractive
   (*a*) Volatile at 100° C.
   (*b*) Non-volatile
6. Alcohol soluble extractive
7. Dilute alcohol soluble extractive
8. Chloroform soluble extractive
9. Tannin
10. Volatile oil
11. Resin

TABLE SHOWING THE DETERMINATION OF MOISTURE, ASH AND ACID-INSOLUBLE ASH IN THE UNGROUND DRUG EPHEDRA NEVADENSIS.

Unground drug.	Moisture.	Ash.	Acid-insoluble ash.
a-	5.5 %	6.8 %	0.25 %
b-	5.59%	7.3 %	0.31 %
c-	5.6 %	7.43%	0.275%
d-	5.14%	7.35%	0.29 %

TABLE SHOWING THE DETERMINATION OF MOISTURE, ASH AND ACID-INSOLUBLE ASH IN THE GROUND DRUG EPHEDRA NEVADENSIS.

Ground drug.	Moisture.	Ash.	Acid-insoluble ash.	Excess ash.
a-	8.04%	.....	.....	.....
b-	8.34%	14.62%	6.67%	6.37%
c-	8.26%	14.56%	6.71%	6.41%
d-	.....	6.41%	0.31%	.....
e-	.....	6.92%	0.34%	.....

TABLE SHOWING THE DETERMINATION OF MOISTURE, ASH AND ACID-INSOLUBLE ASH IN THE DRUG EPHEDRA CALIFORNICA.

Drug.	Moisture.	Ash.	Acid-insoluble ash.
a-	6.57%	6.82%	0.40%
b-	6.69%	6.55%	0.39%
c-	6.43%	6.01%	0.36%

TABLE SHOWING THE DETERMINATION OF CRUDE FIBER IN THE WHOLE DRUG EPHEDRA NEVADENSIS.

	(1).	(2).
Weight of drug	2.250 Gm.	2.325 Gm.
Weight of crude fiber and ash	0.934 Gm.	1.013 Gm.
Weight of ash	0.028 Gm.	0.033 Gm.
Weight of crude fiber	0.906 Gm.	0.980 Gm.
Per cent of crude fiber	42.6	42.15

TABLE SHOWING THE DETERMINATION OF CRUDE FIBER IN THE GROUND DRUG EPHEDRA NEVADENSIS.

	(1).	(2).
Weight of powdered drug	2.080 Gm.	2.060 Gm.
Weight of crude fiber	0.307 Gm.	0.345 Gm.
Per cent of crude fiber	14.76 %	16.75 %

TABLE SHOWING THE DETERMINATION OF CRUDE FIBER IN THE POWDERED DRUG EPHEDRA CALIFORNICA.

	(1).	(2).
Weight of powdered drug	2.112 Gm.	2.030 Gm.
Weight of crude fiber	0.430 Gm.	0.416 Gm.
Per cent of crude fiber	20.36 %	20.49 %

TABLE SHOWING THE DETERMINATION OF ETHER EXTRACTIVE CONSTITUENTS OF EPHEDRA NEVADENSIS.

	(1).	(2).	Average per cent.
1. Total ether-soluble constituents			
(*a*) Market sample	6.24%	6.42%	6.33%
(*b*) Personal sample	8.00%	8.20%	8.1 %
2. Volatile ether-extractive drug	0.5 %	0.7 %	0.6 %
3. Non-volatile ether-extractive	7.5 %	7.5 %	7.5 %
4. Resin content	0.5 %	0.3 %	0.4 %

TABLE SHOWING THE ALCOHOL SOLUBLE EXTRACTIVE CONSTITUENTS OF EPHEDRA NEVADENSIS.

	(1).	(2).	Average per cent.
Market sample	17.7%	17.5%	17.6%

TABLE SHOWING THE COLD WATER SOLUBLE EXTRACTIVE CONSTITUENTS OF EPHEDRA NEVADENSIS.

	1.	2.	Average per cent.
Market sample	8.24%	8.33%	8.28%

Attempted Isolation of the Alkaloid.—1. Using the method employed by Chen (3), 100 Gm. of the powdered drug were exhausted with 80 per cent alcohol. The percolate was evaporated to a thick syrup under reduced pressure, diluted with water made alkaline with ammonium hydroxide and filtered. Two portions of the filtrate were shaken with chloroform, and the chloroformic washings were added to the washings from the filtrate residue. Upon evaporation a green resinous residue was left. This was treated with $N/10$ hydrochloric acid, the solution was filtered and evaporated. At this point, Chen was able to obtain crystals of ephedrine hydrochloride.

When this same procedure was here applied, there no crystals resulted from the hydrochloric acid washings of the alkalinized chloroform; this tends to indicate the absence of any alkaloid of the nature of ephedrine. In order to check thoroughly this finding, two more extractions were made by the use of this method. The results in both of these cases were negative, thus proving that *Ephedra nevadensis* does not contain the alkaloid ephedrine. The residue obtained from each of the four extraction methods was treated with 5 cc. of $N/10$ HCl, and divided into three portions. Each of these portions was treated with an alkaloidal reagent. The results in all cases were negative, as is shown in the following chart:

	Extraction.			
Reagent.	1.	2.	3.	4.
Mercuric-Potassium Iodide T. S. (Mayer's)	Neg.	Neg.	Neg.	Neg.
Tannic Acid T. S.	Neg.	Neg.	Neg.	Neg.
Picric Test Solution	Neg.	Neg.	Neg.	Neg.

2. Five cubic centimeters of ammonia water were added to 25 Gm. of the ground drug, and then ether was used to extract the supposed alkaloid. The ether extract was treated with $N/10$ Sulphuric Acid V. S. to form the water soluble sulphate of the alkaloid. This solution was then made alkaline with ammonia and extracted with more ether. Upon separation of the ether layer and evaporation of the ether, no residue was left: this indicated the absence of any alkaloid in the original material.

3. The above procedure was employed with chloroform in the place of ether; the results in this case were also negative.

4. Two lots of 25 Gm. each of the powdered drug were mixed with calcium hydroxide and thoroughly dried. This mixture was extracted with ether in a Soxhlet extractor for three hours. The ether of the solution was allowed to evaporate spontaneously, and the residue was treated with 10 cc. of $N/10$ hydrochloric acid. The acid solution was then treated with ammonia until neutralization was effected. The solution was then extracted with ether, and the separated ether was allowed to evaporate spontaneously. A slight residue remained in the watch crystal. After the sodium decomposition method for the detection of nitrogen gave negative results, the conclusion may be drawn that the supposed alkaloid cannot be extracted by this method.

THE IDENTIFICATION, ISOLATION, AND APPROXIMATE QUANTITATIVE ANALYSIS OF THE ACTIVE CONSTITUENTS OF EPHEDRA NEVADENSIS.

The Tannin Content.—The extremely astringent taste of the stems of *Ephedra nevadensis* would indicate that a large amount of a tannin is present. A quantitative method of analysis was attempted, using the following procedure (9):

> Ten Gm. of the drug were macerated with 100 cc. of distilled water at 20° C. The solution was filtered from the drug and saturated with sodium chloride. The tannin was then extracted by means of ethyl acetate, but it gave extremely variable results.

This would tend to indicate that the tannin is not of the exact nature of gallotannic acid, such as is present in the various tanning materials.

An alternate method was attempted, in which one Gm. of Gilt-Label French gelatine was dissolved in 100 cc. of distilled water. The solution was standardized against a 1 per cent solution of gallotannic acid which conformed to the standards of the U. S. P. X. One Gm. of *Ephedra* was extracted by maceration with 10 cc. of distilled water at 20° C. and filtered. Five cc. of the filtrate representing 0.5 Gm. of the drug were added to 20 cc. of the gelatine solution. The resultant precipitate was collected on a tared filter, washed with cold water and dried at 60° C. to constant weight. This method did not produce concordant results so that it may be concluded that the quantitative analysis cannot be performed by this method.

Identification of the Nature of the Tannin.—Using the classification outlined by Proctor (10), the tannin from *Ephedra nevadensis* seems to fall into the pyrogallol group, inasmuch as it responds to the following reactions:

> 1. The production of a blue-black precipitate upon the addition of ferric chloride test solution.
> 2. A transient pink color results from the addition of diluted iodine solution.
> 3. Upon the addition of the solution obtained by macerating the powder in cold water to a solution of gelatine, a dense flocculent precipitate results (distinction from gallic acid).
> 4. The aqueous solution produces a precipitate when lead nitrate solution is added (distinction from pyrogallol and gallic acid).

From the fact that a cold water extract of the drug gave no reaction with alkaline cupric tartrate in the form of Benedict's solution, the tannin was in the form of a glucoside. This was verified when it was found that the cold water extract when hydrolyzed with acid, heating or standing, yielded an abundant precipitate with the test solution, indicating the presence of glucose. Upon carefully subjecting

some of the powdered drug to sublimation, pyrogallol was detected in the condensate by the usual tests for this material.

Chapter V.

The Physiological Aspects of Ephedra Nevadensis.

From the high tannin content, it would seem that the best form in which to administer the drug would be in the type of preparation known as fluidextract. Employing the process outlined in the Pharmacopœia, and known as Type Process A, two fluidextracts were made, one using 85 per cent alcohol, and the other, 50 per cent alcohol. In addition, one thousand cubic centimeters of an infusion (modified by the addition of 15 per cent alcohol) were prepared.

The use of the residues obtained from the determination of the alcohol-soluble and ether-soluble constituents gave fractions somewhat unlike. In case of the ether-soluble extractive, the residue consisted largely of chlorophyl in which was embedded the resin and some volatile oil. Therefore, the administration of this material should be of distinct variance from that of the extract made with alcohol, for the alcohol extract necessarily would contain considerable tannin in addition to the chlorophyl and resin. A third extract made with chloroform as a solvent was employed. This preparation was essentially of the same nature as the one made with ether. However, the chloroformic solution did not have the physical characteristic of swelling when heated, the ether extract behaving very much as rubber does, when heated. This would tend to prove the ether extract to be of a slightly different nature than the chloroformic one.

Table Showing the Diuretic Effects of the Administration of Various Preparations of Ephedra Nevadensis.

Preparation.	Subject.	Size of dose.	Results by days. 1.	2.	3.	4.
Fluidextract	A	0.75 cc.	Slight			
50% alcohol		1.0 cc.	+	Slight		
		1.5 cc.		+	Slight	
		2.5 cc.			+	+
Fluidextract	B	Same range	Slight			
50% alcohol		of doses	+	+	+	+
Fluidextract	C	Same range		Slight	Slight	
80% alcohol		of doses	Slight	+	+	+
Fluidextract	D	Same range	Very	Slight	Slight	Slight
80% alcohol		of doses	slightly	+	+	+
Infusion	E	100 cc.	Strongly			
5% strength			+			
Infusion	F	100 cc.				
5% strength			+			
Alcoholic extract—	G	0.375 Gm.	−	All extracts were divided into		
0.065 of extract repre-	H	0.8 Gm.	−	3 doses given about 3 hours		
sents the alcohol sol-	I	1.25 Gm.	−	apart.		
uble constituents of 1	J	2.0 Gm.	−			
Gm. of the drug	K	3.0 Gm.	Slight			
			+			
Chloroformic extractive	L	0.8 Gm.	−			
	M	2.0 Gm.	−			

+ = Positive reactions.
− = Negative reactions.

The mode of administration varied with the preparation, except that all were given by mouth. In case of the fluidextract the liquid was given undiluted. The infusion presented some difficulties because of its extreme astringency. It was thought that some of the astringency might be overcome by the addition of sugar dissolved in the infusion at the time of administration, and this method was used. On the other hand, the administration of the solid extracts was best made by enclosing them in gelatine capsules.

The method of physiological assay was largely of the clinical type. A number of persons were given graduated doses of the various preparations, and the results noted in the foregoing table. There is considerable difficulty because of the personal factor which can only be eliminated by the use of a large number of subjects and observations carried over a number of years. Obviously it would be impossible in a study of this nature to carry on such investigation.

From the results shown in the foregoing table, it will be seen that for the diuretic effect, an infusion form of the drug is best. This would indicate that the water soluble substances were active in stimulating the kidneys. The uniformly negative results obtained from both the alcoholic and chloroformic extracts indicate that the wax resins and chlorophyl are inactive in this respect. In the continued administration of *Ephedra nevadensis* in the fluidextract form some slight constipating effect was noted. This was probably due to the tannin present in these preparations. In no conditions were any untoward symptoms reported, such as any mydriatic action or heart stimulation. This further tends to prove the absence of any alkaloid of the nature of Ephedrine, for in the extracts sufficient of the material was administered to show these reactions if the alkaloid be present.

Chapter VI.

SUMMARY.

The characteristic appearance of the commercial form of the drug, *Ephedra nevadensis*, makes its identification rather easy, when in the whole form. The mounted cross-sections are distinctive in having the tracheals in the xylem composed largely of tracheids. This would make it an easy matter to distinguish it from a cross-section of pine wood, which would be the only possible cause for confusion. On the other hand, when in powder form, *Ephedra* would be rather difficult to identify because of the absence of distinctive elements other than the peculiarly marked tracheals. Pith parenchyma filled with the brownish material might also be listed as a somewhat rather distinctive constituent.

This study indicates that the astringency in the taste of *Ephedra* is due to tannin. This tannin is gallotannic acid as proven by its various reactions and reduction products. Resin was found in the drug to a very limited extent. The amount was so small that no attempt was made to separate out a quantity large enough to analyze for its properties. The rather distinctive odor and some of the taste may be due to the volatile oil. This, too, was of such a small amount that a study of its exact composition was postponed until further supplies of the material could be secured. No doubt the most important function of this study has been to prove that *Ephedra nevadensis* contains no alkaloid. Systematic analysis, confirmed by a number of different methods, has proved the absence of ephedrine.

CONCLUSIONS.

In the study of the physiological qualities of *Ephedra nevadensis*, the following points seem especially pertinent:

1. The drug seems to be possessed of some slight diuretic effects. This characteristic is best shown in the infusion form. From this, it may follow that the water-soluble constituents are of a blenorrhetic nature. The fact that the alcoholic and chloroformic extracts do not possess this property further proves the fact that these constituents are of the water-soluble group.

2. The drug is not strongly active, for doses representing from 5 to 15 Gm. of the drug produce only slight stimulation. This proves that the drug does not belong to the exceedingly active class of medicinal plants.

3. The slight constipating after-effects following the prolonged administration of the fluidextract mitigates its ability to increase excretion through the kidneys. This may be said to be due to the tannin present.

4. The absence of the alkaloid, *Ephedrine*, precludes the use of *Ephedra nevadensis* as a circulatory stimulant, and the other effects ascribed to Ephedrine.

From the recapitulation of the evidence, there seems to be no distinct advantage to be gained by the introduction of *Ephedra nevadensis* into medicine. The properties usually ascribed to it are such that the need is well supplied by some well established therapeutic agent. Outside of its domestic use, very little may be said in its favor.

BIBLIOGRAPHY.

(1) Through the courtesy of Professor Smiley of Occidental College: source not mentioned.
(2) "Dispensatory of the United States of America," Twentieth Edition, p. 1373.
(3) K. K. Chen and Carl F. Schmidt, *J. Pharmacol. Expt. Therap.*, 24, 339 (1924).
(4) *Merck's Ber.*, 13 (1893); through K. K. Chen's article.
(5) Harvard, "Proceedings of the U. S. National Museum," p. 504 (1885).
(6) LeRoy Abrams, "An Illustrated Flora of the Pacific States," Vol. 1, p. 77.
(7) W. H. Foster, "Ephedra for Diseases of the Blood," pamphlet.
(8) "Pharmacopœia of the United States of America, X," p. 463–6.
(9) "Agricultural Analysis," A. A. O. A. A.
(10) Proctor, "Principles of Leather Manufacture," London (1903).

EXAMINATION OF ASARUM CAUDATUM.

BY H. M. BURLAGE AND E. V. LYNN.

A year ago a preliminary report (1) on a few Northwestern plants contained reference to one of the wild gingers. We have now submitted this herb to a more extended examination, with special regard to the interesting volatile oil. Since other members of the genus are now used to some extent in medicine and in perfumery, it was deemed important to learn whether the Washington variety might be employed in the same way.

Asarum caudatum (Lindl.), *Aristolochiaceæ*, is a perennial, possessing stem-like rhizomes, 2 to 8 mm. thick, with branches 10 to 30 cm. long, having a penetrating, ginger-like odor, and a spicy, acrid taste. The roots are thick, fibrous and fleshy. The leaves are evergreen, reniform, cordate, entire, sparsely hairy throughout, and with long petioles. The flowers are solitary, peduncled, brownish

purple or mottled, and borne near the ground. The calyx is campanulate or hemispheric, with oblong-lanceolate, attenuated lobes, 2 to 5 cm. long. The stamens are twelve in number, the placentae are parietal and intruded. The fruit is coriaceous, sub-globose or bursting irregularly, the seeds are flat.

The herb grows profusely in moderately damp places, shady woods, and on steep hillsides, all of which are usually enriched with an abundance of leaf mold. The plant has been found on rocky slopes with some exposure but, under such conditions, the rhizomes become shortened, woody, much branched, and jointed, the leaves are much smaller, and the patches are considerably matted and less extensive. Preliminary tests to determine the limiting circumstances in attempts to cultivate caudatum having given very favorable results, we are at present engaged in extensive experiments to ascertain the best growing conditions, the yield, and the changes in oil content under varying methods of growth.

Six species of asarum have previously been examined, three of them quite completely. Miller (2) found that A. arifolium gives an oil which contains *l*-pinene, eugenol, safrol, methyl eugenol, methyl isoeugenol, asarone, a sesquiterpene, and an unidentified phenol. A. Bicknelli (reflexum) was studied by Kraemer (3) who compared the anatomy with that of other species. The oil from *A. blumei* was found by Schimmel & Co. (4) to contain eugenol, safrol, and a terpene. According to Asahina, (5) the Chinese drug *ToKo* consists of the entire plant. Asahina has also reported that the Chinese drugs, *Sai-Sin* and *Si-Sin* are derived from *A. Sieboldii* (Mig.). Holmes(6), in 1879, described the rhizome and root from the latter and stated that the rhizome is used as a drug in Japan under the title of *To-Sai-shin*.

As early as 1807, *A. Europæum* was studied by Lassaigne and Feneulle (7), and later by a number of others (8). The oil has been found to consist, among other substances, of asarone (3,4,6-trimethoxy-allyl-benzene), *l*-pinene, methyl eugenol, and dimethyl protocatechuic acid. There are also statements in the literature that the plant contains starch, tannin, resin, gluten, citric acid, albumin, malates, and a yellow coloring matter.

Several investigators have examined *A. canadense*, Canada snake root (14). The most valuable contributions to the knowledge of this plant, however, have been made by Power (9). The rhizome was found to yield 1.15 per cent of a volatile oil, a large amount of starch and gum, some resin and fat, a yellow coloring matter, sugar, and an alkaloid. The ash was also examined in detail. The volatile oil contained an unidentified phenol, pinene, *d*-linalool, asarol ($C_{10}H_{18}O$), *l*-borneol, *l*-terpineol, geraniol, methyl eugenol, palmitic acid, acetic acid, and a lactone.

The material used in our present experiments was collected in the White River Valley, Washington, during 1925–26. In order to determine, if possible, the proper time of collection for maximum oil content or for other valuable properties, the plant was harvested at several seasons, each lot being treated individually. The leaves, including petioles, were separated from the rhizomes and roots.

Samples of the fresh material were dried in the air to constant weight and then at 105° C. Small portions of the air-dried samples were subjected to successive extractions with petroleum ether, ether, alcohol, and water, the residues being carried to constant weight at below 70° C. and then at 105° C., and calculated on the completely dry basis. The results follow:

	Rhizomes and Roots.		Leaves and Petioles.	
Loss on Air-drying	78.39		81.53	
Loss at 105° C.	9.33		1.59	
Total Volatile	87.72		83.12	
Petroleum Ether Extract Total	2.73	2.74	2.94	2.21
Non-volatile at 105° C.	1.28	1.39	1.23	1.04
Ether Extract Total	0.71	0.51	1.67	1.70
Non-volatile at 105° C.	0.67	0.44	1.15	1.55
Alcohol Extract	17.32	20.41	18.77	15.38
Water Extract	....	19.72	22.16	20.11

THE VOLATILE OIL.

Each lot of the herb was carefully washed and air-dried and then ground to a coarse powder in a disc mill. After maceration over night with water, the separate samples were subjected to steam distillation until no more oil was obtained. The latter was separated as far as possible and the watery liquid cohobated, the final traces of oil being removed by ether extraction. The collected oil was subsequently dried over calcium chloride and measured in a graduated cylinder. The physical constants of each lot were determined and the yield of oil calculated on the dry basis. The amount obtained from the leaves was so small that the rotation could not be determined on the separate samples, so all of them were combined for this constant. The results are shown in the following table:

	Rhizomes and roots.				Leaves and petioles.			
Collection.	Yield.	d_{20}.	$[\alpha]_{D20}$.	n_{D20}.	Yield.	$[\alpha]_{D20}$.	D_{20}.	n_{D20}.
Summer	2.08%	0.9831	−0.32	1.5118	0.18%	0.9993	+0.55*	1.5146
October	4.06	0.9377	−3.26	1.5000	0.91	0.9299	.....	1.5060
November	3.09	0.9463	+1.21	1.5075	0.67	0.9290	.....	1.5004
December	2.94	0.9627	−2.45	1.5098	0.75	.....	.....	1.5006
April	2.47	1.0017	−0.80	1.4992	....	.....	.....	.....

*Combined samples.

It is thus seen that the leaves and petioles contain but a very small amount of oil, which is undoubtedly furnished chiefly by the latter. In subsequent distillations attention is being almost entirely devoted to the rhizome and roots. It will also be noted that early fall collections give higher yields than at any other time of the year. The physical constants of the oil and, therefore, the chemical composition vary somewhat with time of harvest but this is probably only qualitative.

In order to gain some idea of the components, each lot was examined for total esters, acids, aldehydes and ketones, alcohols, and phenols by the usual methods. The acid value and saponification value were determined by the pharmacopœial processes and the ester number by subtraction. The acetylization was made according to Semmler (10) and calculated by subtracting the saponification value before from that after acetylization. The free acids, phenols, and aldehydes and ketones were estimated by shaking successively and respectively with 5 per cent sodium carbonate, 5 per cent sodium hydroxide, and 35 per cent sodium bisulphite solutions, and observing the diminution in volume. The results are shown in the following table:

Rhizomes.	Acid value.	Sapon. value.	Acetyl value.	Ester value.	Free acid.	Phenols.	Aldehydes.
Summer	5.60	38.45	26.73	34.35	9.1%	2.2%	8.0%
October	1.61	25.86	58.51	24.25	15.9	4.8	3.2
November	1.89	36.32	47.41	34.43	16.2	4.1	5.8
December	5.05	26.98	30.50	21.93	11.3	8.3	0.0
April	3.13	33.03	41.69	29.90	4.0	10.0	4.1
Leaves	7.24	41.43	48.81	34.19	30.0	9.5	2.4

Tests were made by the usual methods for sulphur and nitrogen compounds, with negative results. The mixed rhizome oils were submitted to a methoxy determination by Gregor's modification (11) of Zeisel's method, resulting in a number of 181.3 or 18.13 per cent of CH_3O.

The total oil from all collections of rhizomes and roots was combined and fractionated several times, the final result being shown in the table below, all temperatures being corrected.

Up to 90° C.	5.1%	203–214	2.3%	246–251	4.1%
90–151	2.4	214–224	2.6	251–261	2.4
151–182	7.7	224–235	5.7	Residue	5.3
182–203	2.1	235–246	60.3		

The first four fractions were again distilled several times, using smaller ranges of temperature, with the following results:

Up to 70° C.	15.2%	121–151	7.8%	172–182	18.8%
70–90	7.5	151–162	7.7	182–203	12.6
90–121	7.8	162–172	22.7		

Identification of Pinene.—Fraction 151–162° C. was cooled to —10° C. by means of a freezing mixture and a stream of nitrosyl chloride slowly passed into it. A bluish green color was immediately formed and the addition of absolute alcohol caused the precipitation of white crystals, which were identified as pinene bis-nitrosochloride by a melting point of 103° C. This was confirmed by conversion (12) to the nitrolpiperidide, melting point 118° C.

The fraction boiling between 235° C. and 246° C., which constituted the bulk of the oil, was found to contain no free acids nor aldehydes and but a small amount of a phenol (eugenol ?) which was not identified. The saponification value was found to be 24.9, corresponding to about 8.71 per cent of ester calculated as geranyl acetate. The acetyl value was 7.2, corresponding to 1.98 per cent of alcohol calculated as geraniol. The methoxy number was 241.6, or 24.16 per cent of CH_3O, corresponding to 69.5 per cent of methyl eugenol. The figures found, therefore, indicated that most of the fraction consisted of methoxy derivatives of hydrocarbons.

Identification of Methyl Eugenol.—About one Gm. of the fraction was dissolved in 20 cc. of ether and the solution cooled by a freezing mixture. Bromine was added drop by drop to the cooled solution with shaking until a permanent red color was obtained. The red solution was decolorized by sulphur dioxide and evaporated to remove excess of the reagents and ether. The brown syrupy residue was dissolved in alcohol and the solution allowed to evaporate spontaneously, producing very beautiful needles of tribrom methyl eugenol with a melting point

of 78° C. The presence of methyl eugenol was further confirmed by oxidation according to Wallach (13) to veratric acid, melting at 180–181° C.

Azulene.—The residue from the fractional distillations, when heated under a vacuum, gave at 230° (20–40 mm.) a blue oil having all of the properties of azulene, often found by others and already reported as existing in other asarum oils.

Asarone.—During the distillation of the residue, crystals were deposited in the condenser, in the receiver, and in the distilling flask. These were collected in ether and allowed to crystallize, later being recrystallized from alcohol. The melting point was found to be 61° C. which, with the boiling point and the fact that asarone is found in other species, is considered adequate identification. Crystalline asarone could also be separated from the original oil by cooling in a freezing mixture. Of the other varieties of Asarum, *arifolium* and *Europæum* oils contain asarone, but there seems to be none in that of *Canadense.*

From our work thus far we would estimate that the oil from rhizomes and roots of *Asarum caudatum* contains about ten per cent of azulene, as much or more asarone, sixty to seventy-five per cent of methyl eugenol or closely related methoxy compounds, a small amount of pinene, and probably other terpenes. We are at present engaged in separating and identifying the substances which exist in smaller amounts.

BIBLIOGRAPHY.

(1) E. V. Lynn and Paul Y. Cheng, Jour. A. Ph. A., 15, 105 (1926).
(2) E. R. Miller, *Arch. der Pharmazie*, 240, 371 (1902).
(3) H. Kraemer, *Amer. Jour. Pharm.*, 70, 145 (1898).
(4) "Schimmel & Co. Report" (October, 15 1907).
(5) Y. Asahina, *Jour. Pharm. Soc. Japan*, 361 (1907).
(6) E. M. Holmes, *Jahresber. der Pharm.*, 14, 26 (1879).
(7) Lassaigne and Feneulle, *Amer. Jour. Pharm.*, 13, 179 (1841).
(8) Graeger, *Amer. Jour. Pharm.*, 13, 179 (1841); Blanchet and Sell, *Annalen der Chem.*, 6, 296 (1833); C. Schmidt, *Ibid.*, 53, 156 (1845); Poleck and Staats, *Ber. der Deutsch. chem. Ges.*, 17, 1415 (1884); Rizza and Butlerow, *Ibid.*, 17, 1159 (1884); Petersen, *Ber. der deutsch. chem. Ges.*, 21, 1057 (1888); Lesneur, *Jour. Pharm. Chim.*, (7) 3, 399 (1911); Kofler, *Pharm. Zentralhalle*, 59, 279 (1918).
(9) F. B. Power, Proc. A. Ph. A., 28, 464 (1880); Power and Lees, *Jour. Chem. Soc.*, 81, 59 (1902).
(10) Semmler, "Die Aetherischen Oele," Vol. 1, page 219.
(11) Allen's "Commercial Organic Analysis," Vol. 4 (5th edition), page 625.
(12) Wallach, *Ann. der Chem.*, 245, 253 (1888); 252, 130 (1889).
(13) Wallach, *Ibid.*, 271, 306 (1892).
(14) Rushton, *Amer. Jour. Pharm.*, 10, 181 (1838); Proctor, *Ibid.*, 13, 177 (1841); Stearns, Proc. A. Ph. A., 7, 246 (1858); Lemberger, *Ibid.*, 17, 246 (1869); Van Gorder, *Amer. Jour. Pharm.*, 48, 754 (1876); Bastin, *Ibid.*, 66, 574 (1894); "Schimmel & Co. Report," page 98 (April 1908); p. 85 (April 1909); Newcomb, *Amer. Jour. Pharm.*, 87, 113 (1915).

College of Pharmacy,
University of Washington,
Seattle, Washington.

A STUDY OF THE STABILITY OF PHYSOSTIGMINE SOLUTIONS.*

BY JOHN C. KRANTZ, JR., AND FRANK J. SLAMA.[1]

INTRODUCTION.

It is well known that solutions of the sulphate and salicylate of physostigmine become pink and even red after long standing and are unsuited for medicinal use. The rapidity of the change in color is dependent upon such factors as temperature, purity of the alkaloidal salt and the neutrality of the solvent. With the aim of preventing this color change two practical suggestions have been recorded in the literature[2]; one to dispense the salts in carbonated water and the other to employ a saturated solution of boric acid in water as a solvent when the solution is employed as a myotic. For more complete preservation than accomplished by the presence of carbonated water, the first author observed that the presence of an atmosphere of carbon dioxide—above the solution—preserved it in a colorless condition for a period of seven months and at the time of writing the solution is still colorless.

This investigation was begun in order to determine the nature of the action of these preservatives upon these alkaloidal salts.

THEORETICAL CONSIDERATION.

The reaction causing the decomposition of eserine is hydrolytic in nature and according to Salway[3] takes place in the following manner:

$$\underset{\text{Physostigmine}}{C_{15}H_{21}O_2N_2} + HOH \longrightarrow \underset{\text{Physovenine}}{C_{14}H_{18}O_3N_2} + CH_3.NH_2$$

$$C_{14}H_{18}O_3N_2 \longrightarrow \underset{\text{Eseroline}}{C_{13}H_{18}ON_2} + CO_2$$

Eseroline is the compound responsible for the formation of the red color. As carbon dioxide is one of the products of reaction, obviously the presence of this compound in the water would tend to prevent the hydrolysis of the alkaloid. Then, too, as the hydrolysis of the alkaloid is catalyzed by the presence of hydroxyl ions, carbon dioxide increases the hydrogen-ion concentration of the solution and also in this way retards hydrolysis. It is natural that a reagent which would tend to increase the hydrogen-ion concentration of the solution would retard the hydrolysis for it was observed that a solution of physostigmine sulphate 0.1% showed a p_H of 6.6 but after becoming pink the acidity increased to p_H 3.9.

When the solution of the alkaloidal salt is saturated with methyl amine the hydrolytic tendency is not checked although this is one of the products of decomposition as is carbon dioxide. The presence of methyl amine in the water greatly increases the hydroxyl-ion concentration and thus hydrolysis is immediately activated. Our experiments show that the decomposition is activated by the presence of oxygen and in an atmosphere of the pure gas the solution becomes pink within a period of a day. Thus it would seem that carbonated water above which there is an atmosphere of carbon dioxide should be the ideal preservative for these al-

* Section on Practical Pharmacy and Dispensing, A. PH. A., Philadelphia meeting, 1926.

[1] Instructor in Materia Medica in the University of Maryland.

[2] JOUR. A. PH. A., 13, 347 (1924).

[3] *Trans. Chem. Soc.*, 99, 2148 (1911).

kaloidal salt solutions, as it tends to push back the hydrolytic action by increasing the concentration of one of the products of decomposition, by increasing the hydrogen-ion concentration and by preventing contact with atmospheric oxygen.

EXPERIMENTAL.

Samples of physostigmine sulphate and salicylate were prepared in concentrations of 0.1 per cent. Different solvents were employed and the length of time before the development of a pink color was observed.

The water employed for controls was double distilled and had a p_H of 5.8. The p_H of the other solvents was determined electrometrically with the exception of that of carbonic acid which was calculated from its degree of ionization in 0.1 molar solution.

The table shows the time in days required for the appearance of a pink color.

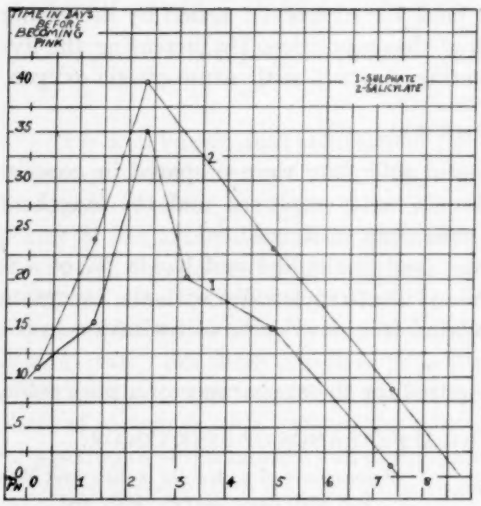
TIME IN DAYS REQUIRED FOR THE APPEARANCE OF PINK COLOR.

Eserine Sulphate in Water p_H 5.8 (Control)	Appearance of pink color on 5th day; 35th and 36th days, orange; 40th, red.
Eserine Salicylate in Water p_H 5.8 (Control)	Pink, 6th day; lavender, 19th to 22nd; light pink, 26th to 33rd; pink, 35th to 40th.
Eserine Salicylate in carbonated water p_H 3.77	Pink through to 40th from 21st day.
Eserine Sulphate in carbonated water p_H 3.77	Pink from 5th day to 36th; 40th, red.
Eserine Sulphate in carbonated water p_H 3.77 with an atmosphere of CO_2 above	Pink 33rd to 40th.
Eserine Sulphate in water p_H 5.8 with an atmosphere of CO_2 above	Pink 22nd to 40th.
Eserine Salicylate in salicylic acid p_H 2.45	None.
Eserine Salicylate in carbonated water p_H 3.77 with an atmosphere of CO_2 above	Pink 22nd to 40th.
Eserine Sulphate in HCl p_H 3.6	Pink 19th to 40th.
Eserine Salicylate in HCl p_H 3.6	Very slight pink 19th to 40th.
Eserine Sulphate in H_2SO_4 p_H 3.7	Pink 26th to 40th.
Eserine Salicylate in H_2SO_4 p_H 3.7	None.
Eserine Sulphate in H_3BO_3 p_H 3.7	Pink 26th to 40th.
Eserine Salicylate in H_3BO_3 p_H 3.7	Pink 26th to 40th.
Eserine Sulphate in water p_H 5.8 with an atmosphere of N_2 above	Pink 19th to 40th.
Eserine Salicylate in water p_H 5.8 with an atmosphere of N_2 above	Pink 19th to 40th.

The following graph on page 414 shows the effect of changes of hydrogen-ion concentration upon the sulphate and salicylate of the alkaloid. The hydrogen-ion concentration was increased in each case by the addition of hydrochloric acid to the solvent.

DISCUSSION OF RESULTS.

It will be observed from the table that under all circumstances the solutions of eserine salicylate were more stable than the solutions of the alkaloidal sulphate. A saturated solution of salicylic acid as a solvent renders the salicylate permanent over a long period of time and likewise sulphuric acid p_H 3.7 has a stabilizing influence in the salicylate solution. The presence of carbon dioxide in the water or atmosphere above the solution does not stabilize the solutions for a long period



Effect of changes of hydrogen-ion concentration upon the stability of eserine solutions.

of time. Carbon dioxide in water and an atmosphere of the gas above the solution gives a colorless solution for a long period of time, in some instances for five or six months in bottles which are almost completely filled. We attribute the preserving influence of carbon dioxide to its ability to increase the hydrogen-ion concentration of the solution, to push the hydrolytic reaction through mass action and also to prevent contact with atmospheric oxygen. The effect seems to be due to the combinations of influences of carbon dioxide as an atmosphere of nitrogen above the solutions did not serve to stabilize them nearly so well as one of carbon dioxide.

CONCLUSIONS.

1. Esersine sulphate and salicylate solutions can be kept colorless for a considerable period of time by adjusting the hydrogen-ion concentration of the solvent to a p_H between 2 and 3.

2. Carbonated water with an atmosphere of carbon dioxide above seems to be the best practical method of stabilizing these solutions.

SCHOOL OF PHARMACY,
UNIVERSITY OF MARYLAND.

THE EFFECT OF GELATIN ON TITRATION CURVES OF VARIOUS ACIDS.*

BY ERNEST LITTLE.[1]

Incidental to the investigation of another problem it became necessary for the writer to construct titration curves for various acids in the presence of and in the absence of gelatin. The resulting curves show surprisingly little effect of gelatin on the titration curves of the various acids. Typical examples are given in Graphs Nos. 1, 2, 3 and 4.

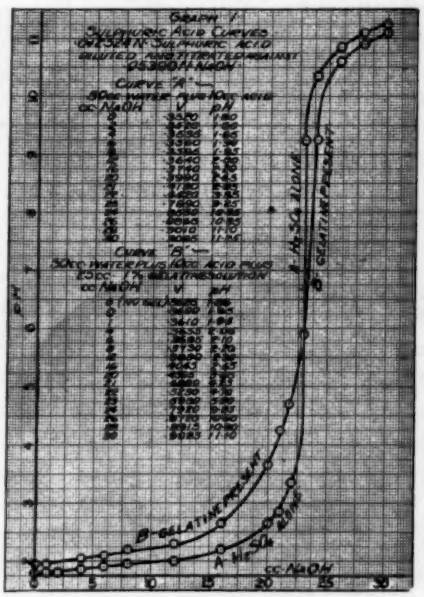
It would seem in light of Loeb's theory of the amphoteric nature of gelatin that the two curves ought not, in each case, to be so nearly the same. Only very minor differences are apparent. Assuming the acid to be in chemical combination with the gelatin, ought we to expect the curves for the titration of the gelatin salt to sodium gelatinate to correspond so completely to that of the acid in each case?

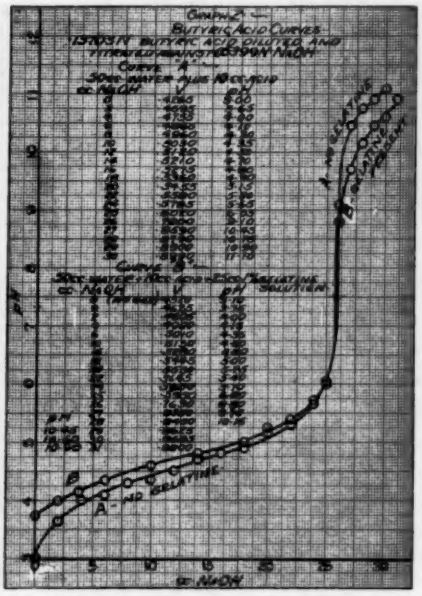
---

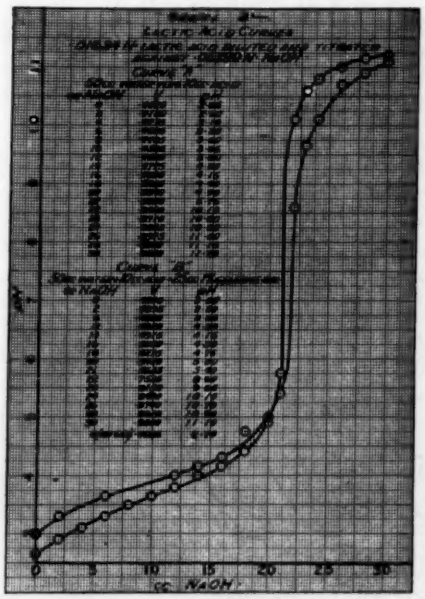
* Scientific Section, A. PH. A., Philadelphia meeting, 1926.

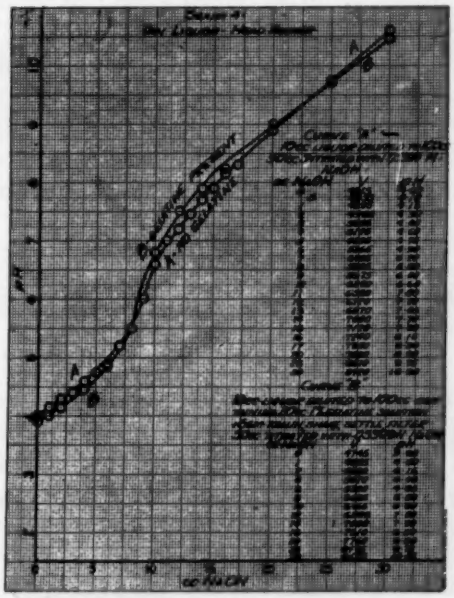
[1] Dean, New Jersey College of Pharmacy, Newark, N. J.

In order to observe results from a somewhat parallel case the titration curve for O amino benzoic acid was constructed and in Graph No. 5 along with Loeb's isoelectric gelatin curve. As would be expected the curves are quite simi-





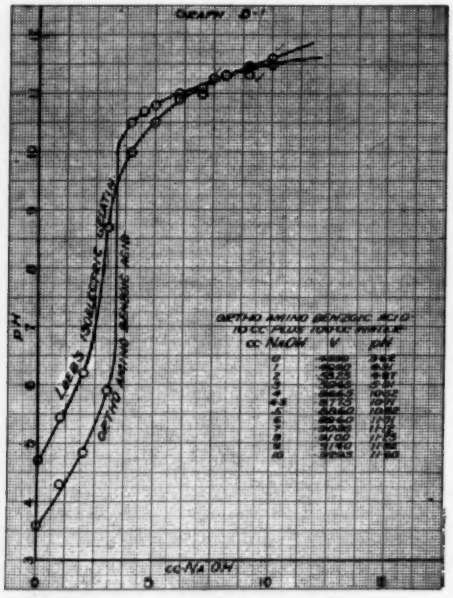


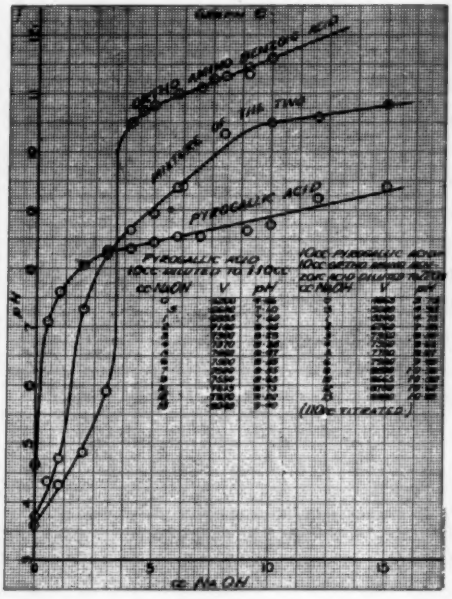


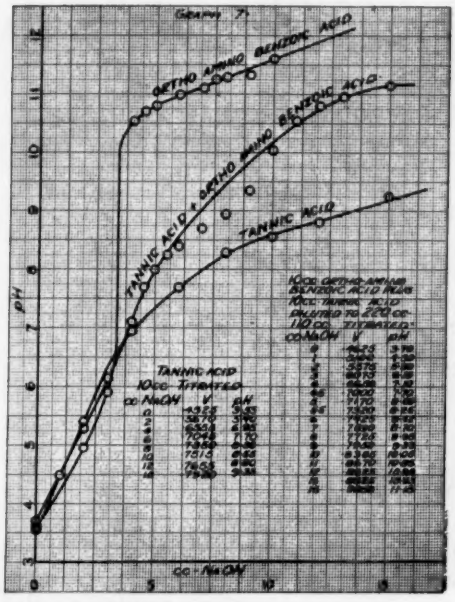
lar due to the fact that both substances have basic and acidic groups in the molecule.

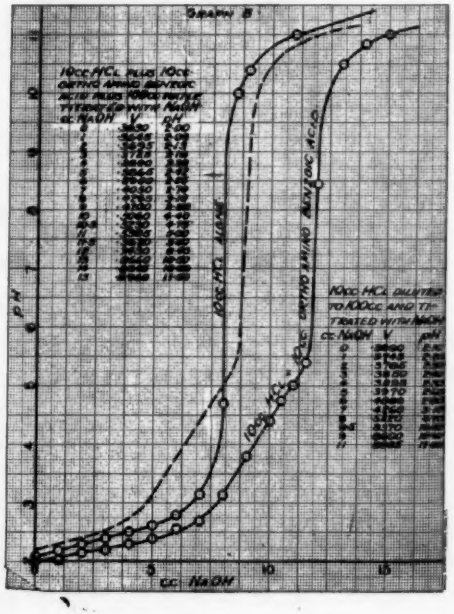
Graph No. 6 shows the titration curves for O amino benzoic acid and for pyrogallic acid. In each case 10 cc. of solution were diluted to 100 cc. and titrated

with approximately $N/10$ NaOH. The titration curve for a mixture of the two is also shown. Here 10 cc. of each acid were mixed, diluted to 220 cc. and 110 cc. of the solution titrated electrometrically. As contrasted with gelatin, the









O amino benzoic acid seems to have a very definite effect on the titration curve of pyrogallic acid and the titration curve for the mixture falls very definitely in between the other two.

In Graph No. 7 the titration curve for tannic acid, O amino benzoic acid and a mixture of equal parts of the two are shown. For the tannic acid curve and the O amino benzoic acid curve, 10 cc. of a solution of each were diluted separately to 110 cc. and titrated electrometrically with approximately $N/10$ sodium hydroxide. The tannic and O amino benzoic acid curve was constructed by mixing 10 cc. of each acid solution diluting to 220 cc. and titrating 110 cc. of the resulting mixture. Here again the O amino benzoic acid shows a very decided effect on the titration curve of tannic acid which effect appears to be roughly additive. In the case of both tannic and pyrogallic acid difficulty was experienced in making readings for high p_H values. The highest p_H value obtained for each addition of sodium hydroxide was used rather than the lower ones obtained when equilibrium was established.

In Graph No. 8 we have shown the titration curves for 10 cc. of approximately $N/10$ hydrochloric acid diluted to 110 cc. and for 10 cc. of hydrochloric acid plus 10 cc. of O amino benzoic acid diluted to 120 cc. Some effect of the amino benzoic acid on the titration curve of hydrochloric acid is here seen, but its influence is much less than in the case of the weaker acids. If the titration curve for the mixture is shoved to the left to the position occupied by the broken lines, the influence is more easily seen. The similarity between these two curves and those shown in Graph No. 1 is very evident. O amino benzoic acid apparently has very little effect on the titration curve of strong acids but a considerable effect on weakly acid substances. Gelatin, however, has no considerable effect on either.

The above curves are presented for the interest and value of them as such and due to the apparent lack of conformity to Loeb's theory as to the chemical amphoteric nature of gelatin, which of course now seems definitely established. It may be pointed out that the equivalent weight of gelatin is so high that the amounts used were not large enough to permit any appreciable effect on the titration curves of the acids worked with. Loeb, however, in constructing his titration curve for isoelectric gelatin worked with an 0.8% solution of gelatin. 0.8 of a Gm. of isoelectric gelatin was present in the 100 cc. of solution used for the titration.

A MODIFIED CALVERT TEST FOR DIETHYLPHTHALATE.

BY R. D. SCOTT AND E. G. WILL.*

The writers have employed over a period of about two years a modified form of the Calvert test for diethylphthalate[1] in the examination of a large number of alcoholic beverages and medicinal preparations. The original Calvert test is briefly: To 3 or 5 cc. of the sample, in a test-tube, add 5 to 10 drops of phenol, 10 drops of concentrated sulphuric acid and heat slowly over a small Bunsen flame until most of the alcohol has been driven off and the sample assumes a red color. Cool, add 15–25 cc. of water, then add an excess of sodium or potassium hydroxide. A red color denotes the presence of diethylphthalate.

Numerous series of tests were carried out to study the effect of temperature

* State Department of Health, Columbus, Ohio.

[1] *American Journal of Pharmacy*, 94, 11, 702 (1922).

necessary for conversion and optimum concentration of phenol, sulphuric acid and alkali. As a result it was found that:

1. The temperature of a boiling water-bath is sufficient, if the reaction is allowed to proceed over night.

2. The amount of sulphuric acid may be materially reduced, thus reducing the volume of alkali added later, without affecting the conversion to diethylphthalate.

3. The sensitivity of the test is increased by the use of a larger proportion of phenol, possibly because evaporation of diethylphthalate may be thereby retarded, thus preventing its escape before reaction.

4. For convenience the phenol and sulphuric acid, diluted with alcohol, may be added together. Leffmann and Trumper[1] use phenol and sulphuric acid together in exact proportion to form phenol sulphonic acid. We have found, as noted above, that the sensitivity of the test is increased by using an excess of phenol. The proportions finally adopted were 250 Gm. of phenol and 15 cc. of concentrated sulphuric acid made up to one liter with 95 % alcohol; the mixture is designated as D. E. P. reagent. Exactly 10 cc. of this reagent is added to from 0.1 cc. to 5 cc. of solution to be tested, contained in a 50-cc. beaker.

5. The sensitivity of the test is much increased by carefully adjusting the amount of alkali finally added. On adding phenolphthalein to prepared buffer solutions it was observed that maximum intensity of red color developed at about p_H 10.5. In more alkaline solutions no further increase in color strength was noted, but fading of color was observed to begin at about p_H 12.7. At p_H 13.1, or in a 0.1 *N* solution of sodium hydroxide, fading is more rapid, while in 10 cc. of *N* sodium hydroxide, the red color produced by 0.1 mg. of phenolphthalein faded in about four minutes. Accordingly, the addition of alkali should be so regulated that the final hydrogen-ion concentration ranges from p_H 11 to p_H 12.

This may be adjusted by running a control test taking 10 cc. of D. E. P. reagent, evaporating over night, adding 50 cc. of distilled water and one cc. of 0.1 per cent aqueous solution of Alizarine Yellow R. Titrate with *N* sodium hydroxide solution until the original light yellow color changes to a full orange shade; this color change takes place at about p_H 11.5. Exactly this volume of *N* sodium hydroxide is then used in the test. If the indicator is not available, practically as satisfactory results may be secured by titrating with 0.2 cc. of 0.5 per cent alcoholic phenolphthalein solution to a faint pink color and then adding just 2 cc. more *N* sodium hydroxide than the volume required for this titration. Usually about 5.3 cc. of *N* sodium hydroxide solution is required.

A blank using the reagent alone and also a control consisting of the reagent plus 0.5 mg. of diethylphthalate are carried through with the sample to be examined. All are evaporated over night, 50 cc. of distilled water and the required volume of *N* sodium hydroxide are added to each.

Depending on the purity of the phenol used, the blank should be colorless to a light salmon or faint pink tint. Using definite amounts of diethylphthalate, 0.1 mg. should produce a light pink color, 0.5 mg. a light red and 1 mg. a red color. The colors persist indefinitely in the p_H range mentioned. To avoid the possi-

[1] *American Journal of Pharmacy*, 97, 8, 507 (1925).

bility of false tests, the presence of diethylphthalate in the sample examined should not be considered established unless the red color produced is at least equal in intensity to that produced by 0.5 mg. of diethylphthalate.

Examination of Commercial Samples.—Alcohol samples, rubbing alcohols and spirit of camphor may be run directly, using 0.1 to 1 cc. for the test. Beverage liquors, if colored, should be distilled. For example, 25 cc. of an approximately 50 per cent alcoholic preparation is distilled and the first 10 cc. of distillate used for the test. Aromatic spirit of ammonia should be distilled. Tincture of iodine should be reduced with zinc dust and distilled. Vanilla extract should be precipitated with basic lead acetate solution as recommended by Wales[1] and distilled before applying the test. In general, a control should be run on authentic preparations known to be free from diethylphthalate at the same time with the sample in question, to eliminate any possibility of a false test. However, it has been the writers' experience that samples which contained diethylphthalate gave full, clear, red colors, while samples which might be classed as giving false tests produced brown colors, or orange colors rapidly fading to brown.

A REVISION OF THE PENTANOLS.

BY S. M. GORDON.

(*Continued from p. 322.*)

THE 3,5-DINITRO-BENZOATES.

3,5-Dinitrobenzoic acid was first prepared by Cahours in 1847 (*Jahresberichte*, 48, 533), its acid chloride by Behrend and Heymann in 1902 (*J. prakt. Chem.*, 65, 291). The first ester to be prepared was the ethyl ester obtained by Voit in 1856 (*Ann.*, 99, 105), by the action of ethyl alcohol on the acid, using sulphuric acid as the condensing agent. It was also obtained by Beilstein and Kurbatow in 1880 (*Ann.*, 202, 223), by acting on ethyl iodide with the silver salt of the acid. The ester in both cases melted at 91° C.

The methyl ester was prepared by Herre in 1895 (*Ber.*, 28, 596) by the action of the acid on methyl alcohol using gaseous hydrogen chloride as the condensing agent. This ester melted at 112° C.

Inasmuch as many of the esters of the alcohols of the methane series are liquid, the crystalline character and the definite melting points of these esters apparently suggested their use for the identification of the so-called fatty alcohols. Thus Mulliken in 1904 ("Identification of Organic Compounds," 1, p. 168), suggests that the alcohols be heated with 3,5-dinitro-benzoyl chloride for ten minutes, and that the reaction product be poured into water and the solid ester be recrystallized from a suitable solvent. He thus prepared the 3,5-dinitrobenzoates up to and including those of the two butyl alcohols.

In 1906 Cohen and Armes (*J. C. S.*, 89, 148), prepared the menthyl ester by heating molecular amounts of menthol with the acid chloride in a boiling water-bath for ten minutes.

In 1922 R. E. Kremers (JOUR. A. PH. A., 12, 626) extended the use of this reagent to the identification of phenols, making use of a modified Schotten-Baumann

[1] *J. Assocn. Official Agr. Chem.*, 9, 4, 477 (1926).

reaction. In this way the 3,5-dinitro-benzoates of the following phenols were prepared: phenol, ortho, meta and para cresol, guaiacol, carvacrol and thymol.

The modification of the Schotten-Baumann reaction originally suggested by Einhorn and Hollandt (*Ann.*, 301, 101 (1898)) using pyridine as the base was extended to the preparation of the 3,5-dinitro-benzoates of several of the isomeric pentanols.

As already pointed out, only two of the four isomeric butyl alcohols were included in the study of the 3,5-dinitro-benzoates by Mulliken. A careful search of the literature failed to reveal the preparation of any of the amyl esters. Inasmuch as these promised to be of importance in the identification of such representatives of this isomeric group as are supposed to occur in plants, the esters of six available isomeric pentanols were prepared. The tertiary pentyl alcohol yielded 3,5-dinitro-benzoic acid, when heated with acid chloride, but yielded the corresponding ester by benzoylation in pyridine solution.

The ester of isoamyl alcohol prepared by direct interaction of the components and by benzoylation in pyridine solution by the method of Einhorn and Hollandt, already mentioned, gave identical products.

Experimental.

The alcohols, with the exception of active amyl alcohol, were obtained from the Eastman Kodak Company. The active amyl alcohol was a sample from the laboratory stock and after purification by distillation had a specific rotation of $+ 5.21°$.

The 3,5-dinitro-benzoyl chloride was prepared according to Berend and Heymann (*J. prakt. Chem.*, 69, 455 (1906)).

The esters were prepared by treating 5 Gm. (1 mol.) of the acid chloride with 2.1 Gm. ($1^1/_2$ mols.) of the pentanol, except in the case of the tertiary alcohol, which will be discussed separately. The tube containing the reactants was placed in a bath of boiling water and heated 10–15 minutes, or until no more hydrochloric acid fumes were evolved as shown by a test with filter paper dipped in NH_4OH. The mixture while still liquid was poured into cold water and set aside until solidification took place. When solid, the crude ester was filtered, dried and crystallized from ligroin (to prevent interchange of alkyl groups).

Attempts to prepare the ester of the tertiary alcohol by this method resulted in formation of the corresponding acid. This indicated that dehydration of the alcohol had taken place, which is in agreement with the well-known behavior of tertiary alcohols. However, when esterification was carried out in pyridine solution according to the procedure of Einhorn and Hollandt (*Ann.*, 300, 100 (1898)) slightly modified, the ester was obtained, but in greatly reduced yield.

Five Gm. of tertiary amyl alcohol ($CH_3CH_2\overset{\displaystyle CH_3}{\underset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}—OH$) were dissolved in 25 cc. of pyridine, cooled in an ice-bath, and 6.5 Gm. of the acid chloride added gradually. As soon as all the acid chloride had gone into solution, the mixture was poured onto ice. If the reaction was allowed to proceed for only an hour before pouring on ice, the acid was completely formed. The solid which separated

was filtered, dried and extracted with ligroin, which serves to dissolve the ester but not the acid simultaneously formed. The ester crystallizes from the ligroin as a mass of colorless, fine needle-like crystals, which melt at 91°, yield 0.25 Gm.

The ester of isoamyl alcohol was prepared by this procedure. Instead of pouring on ice immediately after reaction as above, the reaction was allowed to proceed for 24 hours before pouring on ice. The yield was quantitative. M. p., 61° from ligroin.

Alcohol.	M. P. Ester.	Analysis for Nitrogen by Dumas Method. Calc. $C_{12}H_{16}O_4N_2$.	Found.
1. *N*-Amyl alcohol	45°	9.94%	10.5%
2. Propyl methyl carbinol	60°	....	10.4%
3. Diethyl carbinol	58°	....	9.3%
4. Isobutyl carbinol	61°	....	10.4%
5. Active amyl alcohol	83–84°	....	9.6%
6. Tertiary amyl alcohol	91°	....	10.1%
Mixtures of 2 and 3 melt at 44°			
2 and 4 melt at 52°			

The melting points of three of the esters listed do not show as large a variation as would be desirable. But it is usually recommended that parallel experiments be made, so that the identity of the esters obtained may be confirmed by the determination of the melting points of mixtures. These derivatives make a distinction between the different isomers possible. The usual method is to identify the alcohol in question by boiling point, oxidation to the acid and analysis of the silver salt. Such a method has the shortcoming that it does not distinguish between the four primary of the eight isomeric pentanols.

THE PHENYL URETHANES.

Phenyl isocyanate was first prepared by Hoffmann in 1850 (*Ann.*, 74, 16 (1850)). He also prepared the urethanes of methyl, ethyl and isoamyl alcohols in an impure state. The significance of the reagent, however, for the identification of substances of alcoholic and amine nature was not recognized for over 30 years. Gebhard (*Ber.*, 17, 3033 (1884)) and Kühn (*Ber.*, 17, 2880 (1884)), studied the action of primary and secondary amines on the highly reactive carbanilic acid and thus prepared a number of the urethanes of a basic character. Snape (*Ber.*, 18, 2428 (1885)) and Tessmer (*Ber.* 18, 968 (1885)), prepared the phenyl urethanes of a number of phenols and polyatomic alcohols. Gumpert (*J. prakt. Chem.*, N. F., 31, 278 (1885)) prepared the urethane of isopropyl alcohol by direct interaction of the components.

In spite of the ready reactivity of the body for the identification of alcoholic bodies, it was not until 1904 that the reaction was further applied to mono-atomic aliphatic alcohols. Bloch (*Bull. soc. chim.* (3), 31, 49 (1904)) thus prepared the urethanes of octyl, secondary octyl, undecyl, hexadecyl and myricyl alcohols by direct interactions of the acid and alcohol.

Meanwhile a series of papers dealing with the properties of the methyl,[1]

[1] Hentschell, *Ber.*, 18, 978 (1885); Nolting, *Ber.*, 21, 3155 (1888).

ethyl,[1] propyl[2] and butyl[3] urethanes appeared. The urethanes, however, were prepared by an indirect method.

The use up to this time was probably restricted by the difficulty of preparing the reagent.

The first of the phenyl urethanes to be prepared from the isomeric pentanols was the tertiary amyl alcohol derivative by Lambling (*Bull. soc. chim.* (3), 19, 777 (1898)). Marckwald (*Ber.*, 37, 1049 (1904)) prepared the urethanes of isobutyl and secondary isobutyl carbinol and further studied the melting point relations of mixtures of the two isomers. Mannich and Zernik (*Arch. Pharm.*, 246, 178 (1908)) report on the preparation of the urethane of diethyl carbinol as a solid derivative. Repeated attempts according to their procedure and modified procedures did not confirm their preparation of the solid body. A liquid product results, regardless of the mode of preparation. Continued freezing does not cause solidification. Blaise and Picard (*Ann. chim. phys.* (8), 25, 261 (1912)) prepared the urethane of normal amyl alcohol. As part of this investigation, the phenyl urethane of propyl methyl carbinol was prepared.

Experimental.

The phenyl isocyanate and alcohols used were from the stocks of the Eastman Kodak Company.

One mol. of phenyl urethane was treated with one mol. of the pentanol and heated just to the boiling point. The heat was then removed and the reaction container set aside until the addition compound crystallized. This usually required about a day. Care was taken to exclude moisture as much as possible to prevent the formation of highly insoluble diphenyl urea

$$\begin{matrix} C_6H_5NCO \\ C_6H_5NCO \end{matrix} + HOH \longrightarrow C{=}O\begin{matrix} NHC_6H_5 \\ NHC_6H_5 \end{matrix} + CO_2$$

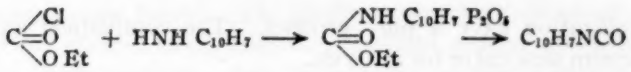
In spite of all precautions to exclude moisture, a small amount of diphenyl urea forms. This was removed by dissolving the urethane in ligroin and filtering. The urethane crystallized on spontaneous evaporation of the ligroin, and was further purified by crystallization from a suitable solvent.

Pentanol.	Solvent.	M. P.	Analysis for N_2 by Kjeldahl. Calc. $C_{12}H_{17}O_2N$.	Found.
1. Normal amyl alcohol	Ethyl alcohol	46°	6.76%	....
2. Secondary carbinol	Methyl alcohol	30°	....	....
3. Isobutyl carbinol	Methyl alcohol	55°	....	....
4. Diethyl carbinol	.....	liquid	....	....
5. Methyl *n*-propyl carbinol	Ligroin	34°	....	6.70
6. Tertiary butyl carbinol[4]	Methyl alcohol	45°	....	6.65

THE α-NAPHTHYL URETHANES.

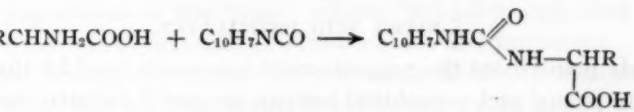
α-Naphthyl isocyanate was first prepared by Hoffmann in 1870 by the interaction of α-naphthyl amine on ethyl chloro-carbonic acid and subsequent distillation with P_2O_5 (*Ber.*, 3, 658).

[1] Weddige, *J. prakt. Chem.*, N. F., 10, 1207 (1874).
[2] Roemer, *Ber.*, 6, 1103 (1873).
[3] Mylius, *Ber.*, 5, 973 (1873).
[4] Lambling, *loc. cit.*, reports melting point at 42° C.



The yields of the carbanilic acid were low and it was not until 1899 that the process was improved. In that year Vittenet (*Bull. soc. chim.* (3), 21, 957) prepared the reagent by direct interaction of phosgene and α-naphthyl amine. The ethyl ester obtained by direct interaction of the two components melted at 79°.

Neuberg and Manasse (*Ber.*, 38, 2361, (1905)) showed that the reagent could satisfactorily be used for the identification of α-amino acids. They react quantitatively to form the corresponding addition products,



which Neuberg and Rosenberg (*Biochem. Z.*, 5, 456 (1907)) further applied the reagent to the identification of α-amino acids.

Neuberg and Kansky (*Biochem. Z.*, 20, 445 (1909)) were the first to point out the use of the reagent as a general one for the identification of aliphatic alcohols. They prepared and characterized a number of the α-naphthyl urethanes of the simpler aliphatic alcohols, up to and including *n*-octyl alcohol.

In 1910, Neuberg and Hirschberg (*Biochem. Z.*, 27, 339 (1910)) showed the general application of the reagent to identify bodies of diverse alcoholic character, such as phenols, cinnamic alcohol, terpenic alcohols, furfuryl alcohol and cholesterol.

Walbaum (*J. prakt. Chem.*, N. F., 96, 250 (1917)) prepared the α-naphthylurethane of α-β-hexylenic alcohol by direct interaction of the components.

A recent article by Bickel and French (*J. A. C. S.*, 48, 747 (1926)) repeated some of the preparations of Neuberg and Herschberg (*loc. cit.*) and extended the use of the reagent for the identification of a variety of other alcohols.

The α-naphthyl urethanes may conveniently be used for the identification of the isomeric pentanols. Neuberg and Kansky thus prepared the urethanes of the following isomeric pentanols; isobutyl carbinol, secondary butyl carbinol, diethyl carbinol, dimethyl-ethyl-carbinol. The preparation of these compounds was rechecked and in addition the urethanes of the following alcohols not previously described were prepared, normal amyl alcohol and methyl normal propyl carbinol.

EXPERIMENTAL.

To one mol. of α-naphthyl isocyanate an equivalent amount of the pentanol was added and the container tightly stoppered. The container was set aside at room temperature until the odor of the isocyanate disappeared, which usually occurred within 24 hours. Neuberg (*loc. cit.*) and Bickle and French (*loc. cit.*) recommend heating to boiling. The yields were uniformily higher using the procedure followed; because at slightly elevated temperatures the moisture contained in the flask reacts with the reagent to give di-α-naphthyl urea. The small amount of di-α-naphthyl urea which formed was removed by dissolving the mixture in ligroin (60–70°) and filtering. The di-α-naphthyl urea is insoluble and remains on the filter paper. The solvent was allowed to evaporate spontaneously. One

further crystallization gave a pure product. The compounds were dried over $CaCl_2$ in a vacuum desiccator for analysis.

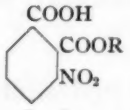
	α-Naphthyl. Urethane of.	M. P. ° C.	Analysis for Nitrogen by Kjeldahl method. Calc. N_2. $C_{16}H_{19}O_2N$.	Found N_2.
1.	Normal amyl alcohol	66–67°	5.45%	5.34
2.	Secondary butyl carbinol	76°	....	....
3.	Isobutyl carbinol	61–62°	....	....
4.	Diethyl carbinol	68°	....	....
5.	Methyl propyl carbinol	76°	....	5.50
6.	Tertiary butyl carbinol	71°	....	....

3-NITRO ACID PHTHALATES.

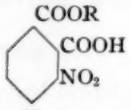
As already pointed out the reagents most commonly used for the identification of alcohols are phenyl and α-naphthyl isocyanates and 3,5-dinitro-benzoyl chloride. The use of these reagents is connected with many disadvantages. With the isomeric pentanols, especially, the melting points are quite low and the isomeric compounds melt within a narrow range. The 3-nitro-acid-phthalates, about to be described, readily yield derivatives of the amyl alcohols, and the melting points of the derivatives so prepared lie sufficiently far apart to make them suitable compounds for the isolation and identification of the isomeric pentanols.

Marckwald and McKenzie (*Ber.*, 34, 486 (1901)) used the acid for the separation of active amyl alcohol from the accompanying isomer, secondary butyl carbinol. They esterified the mixture of alcohol with the acid, using sulphuric acid as condensation reagent. Recently (Nicolett and Sacks, *J. A. C. S.*, 47, 234 (1925)), it has been proposed to use the anhydride of this acid for the identification of aliphatic alcohols. The authors repeated the earlier work on the esters of this acid, up to and including the two common primary amyl alcohols, and have further shown that the esters of the aliphatic alcohols may be crystallized from hot water with very slight losses. This has the advantage of preventing interchange of alkyl groups as might take place when an alcohol is used as the crystallizing medium. Further, since the resulting esters contain a free acid group, the molecular weight may be obtained by titration with alkali.

The substances obtained by the interaction of 3-nitro-phthalic acid anhydride on alcohols are 2-mono-alkyl esters of 3-nitro-phthalic acid (I) (Marckwald and McKenzie (*loc. cit.*)).



I.



II.

McKenzie (*J. Chem. Soc.*, 79, 1137 (1901)) has shown that a small amount of an isomeric form (II) results, but if this is so, it is eliminated in the purification process (Nicolett and Sacks, *loc. cit.*).

3-Nitro-phthalic acid, obtained from the Eastman Kodak Company, was readily converted into its anhydride, by heating the acid with acetic anhydride (McKenzie, *loc. cit.*). The yield is quantitative.

The mono-esters of the pentanols were readily prepared by treating molecular parts of the anhydride and pentanols, and heating on the water-bath for ten minutes,

after the mixture became liquid. The products were then dissolved in hot water or 30% alcohol and allowed to crystallize. Constant melting points were obtained after one or two crystallizations, when the primary pentanols were used, but with the secondary pentanols the reaction did not proceed so readily. Regardless of the length of heating, the mixture of anhydride and secondary pentanol did not become thoroughly liquefied. Thus after heating the secondary alcohol mixtures for thirty minutes the liquid portion was decanted and purified. Water could not be used as crystallizing medium because the compound separated as an oil. Dilute alcoholic solutions acted similarly. Hence the esters of the secondary alcohols were purified by dissolving in chloroform and adding two volumes of ligroin. Slow evaporation of the mixed solvent yielded well-defined crystals. A repetition of the process gave products with constant melting points. The molecular weights of the several compounds not previously described were determined by titration with $N/10$ KOH, using phenolphthalein as an indicator. Tertiary amyl alcohol did not react.

2 Mono-ester of.	M. P. ° C.	M. W. Calc. $C_{12}H_{18}O_6N$.	Found.
Pentanol-1	132–133°	281	280
Methyl 4-butanol-1	165–166°	...	...
Methyl 2-butanol-1	157–158°	...	...
Pentanol-2	102–103°	...	279
Pentanol-3	92°	...	276

SOME APPLICATIONS OF COLLOIDAL CHEMISTRY TO PHARMACY.*

BY PELL BROADY AND C. B. JORDAN.[1]

Believing that it is possible to make further applications of colloidal principles in the preparation of pharmaceutical products, this work was undertaken with that end in view. We assumed that a number of our official ointments could be improved and that several insoluble medicinals could be suspended in a semi-colloidal condition, thus adding to their therapeutic value, if colloidal suspension methods were applied in their preparation. Our results indicate that the assumption was justified.

We gave attention to the preparation of ointments of mercury, of metallic silver ointment, of metallic silver suspensions, of suspensions of the halides of silver and of the suspension of calomel. We believed that, if the proper degree of fineness of subdivision could be secured coupled with the proper suspending colloid, we would be able to secure satisfactory preparations. The literature on Colloidal Chemistry was rather carefully covered and suggested methods were tried, modified and tried again or new methods were developed. A bibliography of the literature will be found at end of paper.

A. OINTMENT OF MERCURY.

Experiment No. I.—Ten Gm. of mercuric nitrate in 15 cc. of H_2O were thoroughly mixed with 45 Gm. of cold lanolin, and 3 Gm. of NaOH dissolved in H_2O

* Scientific Section, A. PH. A., Philadelphia meeting, 1927.

[1] Purdue University School of Pharmacy.

added. The product was a smooth yellow ointment, which darkened on standing and appeared to be reducing. Five cc. of 40% formaldehyde were added and the color deepened to a blue-brown. This preparation was too stiff to be worked readily and 15 Gm. of benzoinated lard were added. A fair ointment of mercury resulted.

Experiment No. II.—No. I was repeated with H_2O_2 substituted for formaldehyde. The ointment had a tendency to crumble and was therefore discarded.

Experiment No. III.—Fifteen Gm. each of lanolin and benzoinated lard were melted together and 20 Gm. of $Hg(NO_3)_2$, triturated to a smooth paste with 20 cc. of H_2O, added and triturated with the mixture of lanolin and lard just before congealing. A very good thick emulsion was formed. Five cc. of 40% HCHO were added and thoroughly incorporated. *No reduction took place after standing several hours.*

A. One-half of above mixture was used and 3 cc. of a saturated solution of NaOH added. Immediate reduction took place with the formation of a good blue ointment, lighter in color than the U. S. P. ointment and with traces of yellow oxide present. Probably not enough NaOH was added.

B. The other half of primary ointments was treated with a slightly larger amount of NaOH and a small amount of HCHO. The result was an ointment lighter than U. S. P. 50% ointment but much darker than the U. S. P. 30% ointment. The amount of Hg present was approximately 30%. This was examined by the microscope and compared with U. S. P. 50% and 30% ointments. The particles of Hg seemed to be 1/10 the diameter of those in the U. S. P. ointments.

Experiment No. IV.—Twenty-five Gm. each of anhydrous lanolin and benzoinated lard were melted together and 50 Gm. of mercurous nitrate, $Hg_2(NO_3)_2$, triturated with 15 cc. of H_2O were added and triturated until the fats congealed. A fine white ointment, showing no reduction, was produced.

A. To one-half of above mixture was added 5 cc. of 40% HCHO and thoroughly incorporated. No change was apparent.

1. To one-half of A was added 2 cc. of 40% NaOH. Immediate reduction with the production of a dark-blue-to-black ointment resulted. Examined with the microscope the presence of some large dark particles and a great number of exceedingly small particles was indicated. High-power lense showed a myriad of round particles about the size of bacteria. The color indicated a good strong ointment of mercury.

2. To the other half of A was added 4 cc. of 28% NH_4OH. Results were as in No. 1.

Experiment No. V.—To the remainder of material used in Experiment IV (25 Gm. each of lanolin and lard and 50 Gm. of $Hg_2(NO_3)_2$) was added 5 Gm. of oleate of mercury to improve the consistency, and 5 cc. of 28% NH_4OH was added. A dark brown ointment was produced.

A. To one-half of above was added 5 cc. of 28% NH_4OH. Color changed to a dark blue. It had the appearance of a good mercury ointment. This led to the assumption that free Hg is produced when NH_4OH is added to $Hg_2(NO_3)_2$ because no reducing agent was added in this experiment.

B. To the other half of above mixture was added excess of HCHO. No change in color was produced, evidently no Hg was freed. Next an excess of

NH_4OH was added and the color immediately changed to that in A. Evidently, the dark color produced when bases are added to mercurous nitrate is not due to the black oxide, as heretofore supposed, but is due to the formation of finely divided mercury.

Experiment No. VI.—NH_4OH was added to a solution of $Hg_2(NO_3)_2$ and a black precipitate was obtained. This was thoroughly washed with HCl. $SnCl_2$ was added to the washings and a white precipitate of Hg_2Cl_2, which turned gray upon standing proved the presence of mercuric salt in the solution. Part of the blue-black residue was dried and it coalesced when rubbed, proving that it was free Hg and that when NH_4OH is added to a mercurous salt in solution, *free Hg* and *not* the *black oxide is obtained.* The remainder of the blue-black residue was easily incorporated into an ointment with the usual ointment bases. This method of preparing mercury ointment is unsatisfactory, as not all of the salt is reduced to free Hg and also because the free Hg secured has a strong tendency to coalesce.

Experiment No. VII.—A solution of NaOH was added to $HgCl_2$ in solution and a yellow precipitate of HgO obtained. To this was added a solution of HCHO and the reduction was immediate. However, globules of Hg formed and, hence, it was unsuitable for making an ointment.

Experiment No. VIII.—To keep the free Hg in a finely divided condition, we decided to peptize it with tannic acid, 40% NaOH was mixed with equal volumes of 1% tannic acid solution and 40% HCHO. To this mixture was added a concentrated solution of $HgCl_2$. There was an immediate reduction to free Hg. The precipitate settled and was washed by decantation until neutral. This removed the excess of NaOH, HCHO, tannic and formic acids. Some of the precipitate was placed under the high-power of a microscope and small, round, nearly transparent particles that showed Brownian movement were seen. This is as near the colloidal state as necessary for smooth ointments. The rest of the precipitate while still moist was incorporated with anhydrous lanolin and an excellent blue ointment resulted.

Experiment No. IX.—Attempts were made to secure a weaker base than NaOH for this reduction and thus avoid the work of washing the reduced precipitate. Yellow oxide, HgO, was rubbed to a very fine powder and HCHO added, but no reduction took place. This was repeated and $Ca(OH)_2$ added; some reduction ensued but not enough to assume complete reduction. It was repeated and NH_4OH added. Reduction is desirable but the likelihood of the presence of the double salt is objectionable. Repeated and NaOH added. Immediate and complete reduction resulted.

From these experiments we concluded that the presence of some strong base is necessary for complete reduction.

Experiment No. X.—From our preceding experiments we developed the following procedure and all of our Freshmen students were required to make the ointment:

Mercuric Chloride	40 Gm.
Sodium Hydroxide, sticks	40 Gm.
Gelatin, leaf	2.5 Gm.
Liq. Formaldehyde, 40%	20 Gm.
Anhyd. Lanolin	25 Gm.
White Petrolatum q. s. ad	100 Gm.

Dissolve gelatin and NaOH in 200 cc. of H_2O with heat. *Cool* and add solution of HCHO. Dissolve the $HgCl_2$ in 200 cc. H_2O by aid of heat. While still hot, add slowly and with stirring to solution of NaOH, HCHO and gelatin. This should be done slowly and with care. Allow the precipitate to settle completely and decant. Wash the precipitate by decantation with two successive portions of 200 cc. of H_2O, allowing the precipitate to settle each time. Filter and transfer precipitate *while still moist* to a mortar and add 25 Gm. of anhydrous lanolin and thoroughly mix. Add enough white petrolatum to make 100 Gm. and mix thoroughly.

Caution. Do not allow precipitate to dry on filter.

All of our freshmen students made good mercurial ointments by this method and the time required was about one hour. The proportion of Hg up to 60% can be varied at will. We do claim that this method is better than the one in vogue for the following reasons:

1. The ointment can be prepared in less time.
2. It is easier to prepare it.
3. The free Hg is in a much finer divided condition and therefore of greater therapeutic value.

Experiment No. XI.—The Ointment of Mercury was also prepared by a modified Carey Lea's method of preparing silver sols. as follows: Four Gm. of dextrin and 4 Gm. of KOH were dissolved in 100 cc. of H_2O. Three Gm. of $HgCl_2$ were dissolved in 20 cc. of H_2O with heat. The two solutions were mixed while hot and 5 cc. of 40% HCHO added. A very fine blue-black precipitate was obtained, almost colloidal in nature. Washed until neutral to litmus and the moist precipitate incorporated in sufficient lanolin to make the desired per cent of Hg in the ointment. This made an ointment with the Hg more finely divided and hence of greater therapeutic value, but considerable time was consumed in washing because the finely divided Hg settled very slowly.

SILVER OINTMENT.

Experiment No. I.—A good appearing ointment of silver was made by Hatschek's method "Laboratory Manual of Colloidal Chemistry" by Emil Hatschek, pp. 39–40. Silver nitrate is dissolved in H_2O and mixed with anhydrous. This method is objectionable for an ointment because NaOH may be present in the finished product. The procedure was therefore modified.

Experiment No. II.—A solution of $AgNO_3$ was added to a solution of $Ca(OH)_2$ and a brown precipitate of Ag_2O was obtained. This turned in the sunlight to a black precipitate of Ag. So much lime water was required that it was almost impossible to mix the solution with anhydrous lanolin and secure a fair percentage of Ag in the ointment. Therefore this method was abandoned.

Experiment No. III.—Modified Carey Lea's method. Four Gm. of dextrin were dissolved in 100 cc. of H_2O and 4 Gm. of stick NaOH added; 3 Gm. of $AgNO_3$ were dissolved in 20 cc. of H_2O and this solution was added, with stirring, to the dextrin soda solution. A precipitate of Ag_2O was obtained which was gradually reduced by the dextrin to Ag. This was precipitated by alcohol and the precipitate washed free from alkali by alcohol. While the precipitate was moist it was incorporated in anhydrous lanolin making an excellent Ag ointment.

COLLOIDAL SILVER HALIDES.

Experiment No. I.—Prepared a 2% gelatin solution and added NaCl. $AgNO_3$ dissolved in water was added to above with agitation. A milk-white thick suspension of AgCl was secured. A drop of this added to 10 cc. of H_2O forms a homogenous white suspension. This was stable in the dark but sunlight reduced it.

Experiment No. II.—A solution of $AgNO_3$ was added to a 2% gelatin solution and mixed. HCl was added drop by drop with agitation. The solution was definitely acid to methyl orange. A curdy white precipitate settled out. Upon standing this was peptized and a stable suspension formed. This reduced in the sunlight.

Experiment No. III.—Repeated No. I but controlled the p_H by use of NaOH. Had a p_H of 10 when the $AgNO_3$ solution was added. A heavy white precipitate was obtained which was easily peptized in an excess of NaCl. This suspension was stable in the dark but reduced by sunlight.

All of the above suspensions of AgCl were precipitated by alcohol but are not reversible to any great extent.

Experiment No. IV.—Stable suspensions of AgI were made, using method described in N. N. R. 1925, under Neo-Silvol. Prepared a colloidal precipitate of Ag by precipitating Ag_2O in the presence of gelatin with an excess of NaOH and reducing with HCHO. Treated this preparation with Wagner's Reagent (I_2 in KI) and secured a brown to cream suspension of AgI. In dilute suspension this is stable in sunlight but stronger suspensions reduce in sunlight. Evidently a very fine suspension well protected by gelatin is stable in sunlight.

Experiment No. V.—Repeated above, using Br_2 in KBr and secured a sunlight-stable suspension of AgBr.

Experiment No. VI.—Attempted to secure the same kind of suspension of AgCl by passing chlorine gas into a silver sol. No reaction took place. Apparently a chloride is necessary or the Cl_2 in the gas was not sufficiently concentrated to cause a union with the Ag sol.

Experiment No. VII.—Repeated No. VI, using KCl and changing the p_H value, but was unable to secure a suspension that was sunlight stable.

Experiment No. VIII.—Since it seemed impossible to secure a sunlight-stable suspension of AgCl by using chlorine gas or the ordinary chlorides with $AgNO_3$ or with the silver sol, we next tried dichloramine T as a source of chlorine. The silver sol and a solution of dichloramine T were heated on a water-bath. The brown color of the silver sol disappeared and a white suspension of AgCl was formed. The dichloramine T was filtered out and the dilute solution of colloidal AgCl was exposed for several days to the action of sunlight. *It was stable* in sunlight.

COLLOIDAL CALOMEL.

Experiment No. I.—A solution of NaCl was added to a 2% solution of gelatin and dilute solution of $Hg_2(NO_3)_2$ was prepared and added slowly and with agitation to the gelatin-NaCl solution. A stable suspension of Hg_2Cl_2 resulted.

YELLOW WASH N. F.

Yellow Wash of the N. F. settles out and has to be dispensed with a "shake label." Attempts were made to stabilize this precipitate as follows:

Experiment No. I.—A solution of 2 Gm. of acacia tears was made and mixed with a solution of 0.6 Gm. of $HgCl_2$; 200 cc. of $Ca(OH)_2$ were added. No precipitate of yellow oxide was formed. The solution turned a pearl grey and upon standing 24 hours a bluish black precipitate of Hg formed. HgO must be very unstable when first formed and easily reduced by the organic acacia.

Experiment No. II.—A 5% solution of gelatin was used and molecular proportions of $HgCl_2$ and $Ca(OH)_2$. The gelatin prevented the precipitation of HgO. Solution became opalescent and upon standing a white flocculent precipitate settled out.

Experiment No. III.—Repeated Experiment II but added the gelatin last and after the yellow HgO was formed. The yellow oxide settled slowly and adhered to bottom of container.

Experiment No. IV.—Repeated Experiment I and added a solution of NaOH. No yellow precipitate formed. Heated the preparation and a grey-blue precipitate of metallic Hg formed. It is evident that it will be impossible to peptonize HgO precipitate if the peptizing agent is present when the HgO is formed. Time did not permit a series of experiments to determine whether it is possible to peptize this precipitate after it is formed.

CONCLUSIONS.

1. A new and, we believe, a better method of preparing ointment of mercury is described.
2. A method of preparing an ointment of metallic silver is described.
3. Methods for preparing sunlight-stable silver iodide, bromide and chloride have been developed.
4. A method of preparing colloidal suspension of calomel is given.

BIBLIOGRAPHY.

Holmes, "Laboratory Manual of Colloidal Chemistry," John Wiley & Sons (1922).
Svedberg, "Colloidal Chemistry," Chem. Catalog Co. (1924).
Chapin, "Second Year College Chemistry," John Wiley & Sons (1925).
Alexander, "Colloidal Chemistry," D. Van Nostrand Co. (1924).
"New & Non-Official Remedies," American Medical Association (1922–25).
Bancroft, "Applied Colloidal Chemistry," McGraw-Hill Book Co.
Loeb, "Proteins and the Theory of Colloidal Behavior," McGraw-Hill Book Co. (1922).
Hatschek, "Laboratory Manual of Elementary Colloidal Chemistry," P. Blakiston's Son & Co.
Bogue, "Colloidal Behavior," Vols. 1 and 2, McGraw-Hill Book Co.
Getman, "Outlines of Theoretical Chemistry," John Wiley & Sons.

THE ORGANIZATION OF THE DRUGGISTS' RESEARCH BUREAU.

Secretary E. L. Newcomb advises that some publications have credited the organization of the Druggists' Research Bureau solely to the National Wholesale Druggists' Association, whereas the National Association of Retail Druggists should share the credit equally. The N. W. D. A., through its work and activities, made the original recommendations which led to organization of the Bureau. The Secretary also states that the Druggists' Research Bureau is now being directed by a joint committee representing the National Association of Retail Druggists, the American Association of Colleges of Pharmacy and wholesale and manufacturing members of the National Wholesale Druggists' Association. Splendid progress is being made in promoting the work of the Bureau.

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A. G. DuMez, Reporter on the Progress of Pharmacy.

All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually. Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A. G. DuMez, University of Maryland, School of Pharmacy, N. E. Cor. Lombard and Greene Sts., Baltimore, Md.

APPARATUS AND MANIPULATIONS.

Clark, A. H.
Simple continuous extraction apparatus
Ind. Eng. Chem., 19 (1927), 534

Wolffram, H. W.
Combination distillation and reflux condensers
Pharm. Zentralh., 67 (1927), 477

Zimmerlie, A.
Distillation of formaldehyde solution
Ind. Eng. Chem., 19 (1927), 524

PHARMACOPŒIAS AND FORMULARIES.

Rusby, H. H.
Pharmacopœia revision in the interest of pharmacal service
Drug. Circ., 71 (1927), 321

PHARMACEUTICAL PREPARATIONS.

Brandrup, W.
Adulteration of tincture of valerian with isopropylalcohol
Apoth. Ztg., 42 (1927), 423

Knight, W. A.
Aqua Laurocerasi, B. P.
Pharm. J., 118 (1927), 329

Burn, J. H.
Standard for the biological assay of squill
Pharm. J., 118 (1927), 328

Kroeber, Ludwig
Fluidextract of Linaria vulgaris
Pharm. Zentralh., 68 (1927), 163

Toni, Giussepe
Stable solutions of novocaine-adrenaline
Biochim. terap. sper., 13 (1926), 378; through *Chem. Abstr.*, 21 (1927), 1166

PHARMACOLOGY AND THERAPEUTICS.

Anon
Case of acute thallium poisoning
Deut. med. Wochschr., 52 (1926), 1550; through *Pharm. Zentralh.*, 68 (1927), 201

Burn, J. H., and Ellis, J. Mary
Biological assay of the specific alkaloid of ergot
Pharm. J., 118 (1927), 385

Haag, H. B., and Bond, W. R.
Sodium thiosulphate in arsenic poisoning
J. A. M. A., 88 (1927), 1219

Munns, G. F., and Aldrich, C. A.
Ephedrine in bronchial asthma in children
J. A. M. A., 88 (1928), 1233

Ockerblad, Nelse F.
Ephedrine in spinal anesthesia
J. A. M. A., 88 (1927), 1135

Raymond-Hamet
Contribution to the pharmacodynamic study of Anemone pulsatilla, L.
Bull. sci. pharmacol., 34 (1927), 143

Swanson, Edward E., and Hargreaves, Chester C.
Standardization and stabilization of aconite preparations
JOUR. A. PH. A., 16 (1927), 296

Takase, T., and Ohashi, H.
Action of domesticin-methylether on the peripheral nerves
J. Pharm. Soc. Japan, No. 541 (1927), 210

BOTANY AND BACTERIOLOGY.

Dieterle, H.
Drosera binata
Apoth. Ztg., 42 (1927), 396

Fujita, N., and Inubuse, M.
Anatomy of the magnolia barks
J. Pharm. Soc. Japan, No. 541 (1927), 199

Gillot, Paul
Researches on the seeds of Euphorbia Amygdaloides, L
Bull. sci. pharmacol., 34 (1927), 139

Hirst, H. M.
Report on the Scarborough herb garden
Pharm. J., 118 (1927), 298

Hoyt, L. F., and Ellenberger, E. P.
Fumigation tests with chloropicrin
Ind. Eng. Chem., 19 (1927), 461

Kimura, K.
Anatomy of buchu leaves
J. Pharm. Soc. Japan, No. 541 (1927), 205

Krause, Otto
Falsification of tragacanth
Pharm. Ztg., 72 (1927), 331

Stover, Norman M., and Hopkins, B. S.
Fungicidal and bactericidal action of selenium and tellurium compounds
Ind. Eng. Chem., 19 (1927), 510

ALKALOIDS AND GLUCOSIDES.

Davy, Edward D., and Chu, H. P.
Glucosides of Caulophyllum thalictroides
JOUR. A. PH. A., 16 (1927), 302

Eder, R., and Märk, H.
Estimation of morphine in opium
Pharm. Acta Helv., 2 (1927), 41

Guillaume, A.
Silicotungstates of pilocarpine, pseudo-pelletierine and the estimation of these alkaloids
Bull. sci. pharmacol., 34 (1927), 151

Hairs, Eng.
Assay of opium
J. pharm. Belg., 9 (1927), 277

Kondo, H., and Sanada, T.
Alkaloids of Stephania japonica
J. Pharm. Soc. Japan, No. 541 (1927), 177

Magnin, Jorge
Examination of viscera that have been preserved for several years for alkaloids
J. pharm. chim., 5 (1927), 323

Magnin, Jorge
Purification of organic liquids in the toxicological assay of alkaloids by means of lead chloride
J. pharm. chim. 5 (1927), 316

Nielsen, C., McCausland, H., and Spruth, H. C.
Occurrence and alkaloidal content of various ephedra species
JOUR. A. PH. A., 16 (1927), 288

Pace, Edgardo
Microcrystallographic chemical study of double salts of cocaine with rare metals
Arch. farmacol. sper., 42 (1926), 35; through *Chem. Abstr.*, 21 (1927) 1327

Schousen
Determination of alkaloids in extracts and tinctures of solanaceous drugs
Farm. Tidende (1923), 835; through *Pharm. Zentralh.*, 68 (1927), 183

Shinoda, J.
Constitution of garcinine
J. Pharm. Soc. Japan, No. 541 (1927), 186

Tsiang, Kuen, and Brown, E. D.
Detection and isolation of ephedrine from the toxicological standpoint
JOUR. A. PH. A., 16 (1927), 294

von Mikó, Julius
Determination of the theobromine content of theobromino-sodium salicylate
Pharm. Acta Helv., 2 (1927), 51

Wattiez, N.
Iodometry applied to the determination of certain alkaloids
Bull. acad. roy. méd. Belg., 6 (1926), 748; through *Chem. Abstr.*, 21 (1927), 1165

ESSENTIAL OILS.

Kopp, Elmer
Roumanian Caraway oil
Pharm. Zentralh., 67 (1927), 212

Schoorl, N.
Optical rotation of camphor in alcoholic solution
Pharm. Weekbl., 64 (1927), 338

Van den Driessen Mareeuw, W. H. P.
Simple and rapid reaction for distinguishing between oil of anise and oil of star anise
Pharm. Weekbl., 64 (1927), 189; through *Chem. Abstr.*, 21 (1927), 1327

INORGANIC CHEMICALS.

Brown, Herman
Simple method for the preparation of aurothiosulphate
J. Am. Chem. Soc., 49 (1927), 958

Manicke, P., and Lauth, H.
Contribution to the quantitative toxicological determination of tin
Pharm. Zentralh., 68 (1927), 162

Scott, Alfred W.
Preparation of sodium hyponitrite
J. Am. Chem. Soc., 49 (1927), 986

Van Eck, P. N.
Günzburg's reagent for free hydrochloric acid
Pharm. Weekbl., 64 (1927), 304

ORGANIC CHEMICALS.

Astruc and Mousseron
Formation and estimation of allyl isothiocyanate in mustard flour
J. pharm. Chim., 5 (1927), 313

Bartholomé, J.
New indicators
J. pharm. Belg., 9 (1927), 229

Bosart, L. W., and Snoddy, A. O.
New glycerol tables
Ind. Eng. Chem., 19 (1927), 506

Carswell, T. S.
Melting point of acetylsalicylic acid
Jour. A. Ph. A., 16 (1927), 306
Genot, Clément
Some tests for the identification of urethane
J. pharm. Belg., 9 (1927), 245
Genot, Clément
Some tests for the identification of veronal
J. pharm. Belg., 9 (1927), 261
Harden, Wilton C., and Dunning Fitzgerald
Preparation of bismuth thioglycoamide
J. Am. Chem. Soc., 49 (1927), 1017
Lematte, L., Boinot, G., and Kohane, E.
Determination of mineral matter in the principal animal organs used in therapy
J. pharm. chim., 5 (1927), 325
Magnin, Jorge
On the presence of aldehyde in anesthetic ether
J. pharm. chim., 5 (1927), 241
Perkins, G. A., and Cruz, A. O.
Synthesis of compounds similar to chaulmoogric acid
J. Am. Chem. Soc., 49 (1927), 1070
Rinkenbach, W. H.
Properties of diethylene glycol
Ind. Eng. Chem., 19 (1927), 474
Van Zijp, C.
Santonin and herapathite
Pharm. Weekbl., 64 (1927), 278

A PHARMACEUTICAL STUDY OF SYRUP OF FERROUS IODIDE (1840–1927).

BY CATY J. BRAFORD AND H. A. LANGENHAN.

(*Continued from p. 339.*)

No. II. Formulas and Processes Both Original and Improved.

When Durand,[1] of Philadelphia, first prepared Dr. Jackson's Solution of Iodide of Iron (1833), he used a process which M. M. Baup and Caillot had outlined in a paper on the "Preparation of the Iodides." His formula varied slightly from theirs, however, in that the proportion of the iron filings was changed to avoid, as he said, the production of a "periodide" of iron. He also increased the amount of water used in order to have a solution that was of lesser strength. His revised formula was as follows:

Iodine	10	drachms
Iron filings, perfectly pure and unoxidized	5	drachms
Distilled water	12.5	ounces

The iodine was mixed with one-half of the water and the iron filings were added in small portions. The heat evolved vaporized a small amount of the iodine. When the entire amount of iron had been added, and first an orange and finally a dark red color had been produced, the solution was slowly heated (with continued stirring). An "ioduretted hydriodate of iron" was first produced, which was converted to the "simple hydriodate" by the action of the heat. This reaction caused the solution to become colorless; it was then filtered and the residue and the filter were washed with the remaining half of the water. This process produced twelve and one-half fluidounces of a preparation which contained one drachm of the iodide of iron in each fluidounce.

The following year (1834), Dr. A. T. Thomson[2] of the London University recommended a method in which one part of iron wire was rubbed with three or four parts of iodine. Fifteen parts of water were gradually added and the entire mixture was introduced into a Florence flask with an additional portion of iron wire and of

[1] Durand, *Am. J. Pharm.*, 4, 287 (1833).
[2] Thomson, see Dunglison, "New Rem.," 5th ed., 297 (1846).

distilled water. The solution was boiled until it acquired a pale greenish color and was then filtered. The finished product contained the "hydriodate of the protoxide of iron" and could be used for medicinal purposes, if the amount of iodine had been previously ascertained.

About the same time Beral[1] published a paper discussing several of the iron preparations, among which was Syrup of Iodide of Iron. He offered a formula which directed that the Liquor of Iodide of Iron be added to Simple Syrup. One teaspoonful of the finished product contained one grain of the dry iodide of iron.

Nicot[2] prepared what he called an "Unalterable Solution of the Protoiodide of Iron." His formula is interesting because it directs the use of both sugar and glycerin.

Sugar	4 Gm.
Iron (by hydrogen)	8 Gm.
Distilled water	40 Gm.
Pure glycerin	110 Gm.

"Mix the iodine and sugar in a porcelain mortar, adding the iron by degrees. Heat gently in a capsule, stirring with a glass rod, and filter to separate the excess iron, then add the glycerin. The mixture should weigh one hundred and fifty Gm. The syrup is made to contain six Gm. of ferrous iodide to one hundred cc. of syrup."

Rousillon[3] worked along the same lines and devised a similar preparation. He did not mix the glycerin solution with the simple syrup until the product was to be dispensed.

In 1840, Liquor Ferri Iodidi was introduced into the U. S. Pharmacopœia. The quantities of iron and iodine were in the same proportion as those in Durand's formula. One ounce of iron was used to two ounces of iodine, which, according to the molecular formula for ferrous iodide (FeI_2), leaves an excess of iron. The method of preparation was about the same as that outlined by Durand. When this Liquor was replaced by the Syrupus Ferri Iodidi in the U. S. P. of 1860, a slight change was made in the formula. The new formula directed the use of two Troy ounces or nine hundred and sixty grains of iodine and three hundred grains of iron in the form of cut wire. As will be noted this was a proportionally smaller amount of iron but it was still an excess. The quantities remained the same in the revision of 1870 but in 1880 they were again changed. This time the use of twenty-five parts of iron and eighty-three parts of iodine were prescribed. In the U. S. P., of 1900, the strength of the syrup was changed from 10% to 5% of ferrous iodide so the amount of the iron and iodine was also reduced to one-half. These quantities were also prescribed in the U. S. P. of 1910. The last revision (1920) changed the requirements of the syrup from 5% by volume to 5% by weight which made it necessary to again alter the formula slightly. The new proportions are twenty Gm. of iron to sixty Gm. of iodine, which decreases the excess of iron but still allows enough to combine with all the iodine and yet leave some to be filtered out.

The following table offers a summary of the various changes that have occurred during the sixty years in which Syrup of Ferrous Iodide has been official.

---

[1] Beral, *Jour. de Chem. Med.*, from *Jour. Pharm.*, 13, 72 (1842).

[2] Nicot, *Bull. gen. de Pharm.* (July 30, 1888); through *Am. J. Pharm.*, 60, 449 (1888).

[3] Rousillon, *Jour. de Pharm.*, (5) 28, 243; through British Year Book, 31, 201 (1894).

Revision.	Iron.	Iodine.	% of I.	I.	Fe req.	Exc. Fe.	FeI_2	Sp. Gr. syrup.	Product.
1860	300 grs.	2 tr. oz.	none given		211 grs.	89 grs.	365 grs.		20 fl.oz.
1870	300 grs.	2 tr. oz.	none given		211 grs.	89 grs.	365 grs.		20 fl.oz.
1880	25 parts	82 parts	100	82	18.1 parts	6.0 parts	100.1 parts		1000 parts
1890	25 Gm.	83 Gm.	98.85	82	18.1 Gm.	6.9 Gm.	100.1 Gm.	1.35	1000 Gm.
1900	12.5 Gm.	41.5 Gm.	99	40.6	8.9 Gm.	3.6 Gm.	49.5 Gm.	1.349	1000 Gm.
1910	12.5 Gm.	41.5 Gm.	99.5	41.3	9.1 Gm.	3.4 Gm.	50.4 Gm.	1.35	1000 Gm.
1920	20 Gm.	60 Gm.	99.5	59.7	13.2 Gm.	6.8 Gm.	72.8 Gm.	1.37	1370 Gm.

As will be noted there is no purity rubric given for the iron and it can therefore be supposed that the iron was pure, as stated in the official description. There is, however, a standard given for the iodine with the exception of the 1860 and 1870 revisions. This varies somewhat in the different revisions and partly accounts for the difference in the quantities of iodine prescribed. The fifth column of the table contains the absolute iodine prescribed. Column six indicates the amount or iron necessary to combine with the "absolute" iodine according to the following equation: $Fe + I_2 \longrightarrow FeI_2$.

Column seven is the theoretical amount of iron to be filtered out of the preparation. The next column gives the theoretical amount of ferrous iodide which will be formed. The first three Pharmacopœias gave no specific gravity for the finished syrup and the first two directed that it be made up to a given volume. The U. S. P. of 1880 specified one thousand parts by weight. The next three revisions directed that the finished product weigh one thousand Gm. and also included a requirement as to the specific gravity. The new U. S. P., for 1920, has changed the formula and requires that the syrup be made to measure one thousand cc. It also gives a specific gravity.

The method of preparation has varied somewhat since the Syrup of Ferrous Iodide was first introduced into the U. S. P. in 1860. The following paragraphs offer a brief résumé of seven different methods that have been official.

METHODS OF PREPARATION.

(*a*) *Order of Mixing.*—The revisions of 1860 and 1870 simply directed that the iodine, iron and water be mixed together. The next three revisions specified the addition of the water before the iodine was added. The last two revisions changed the order again and directed that the water be added to the mixture of iron and iodine.

(*b*) *Size and Type of Flask Used.*—Each Pharmacopœia with the exception of the last one (1920) has directed that a "thin glass flask" be used. The size of the flask was not especially considered until in the 1880 edition, when a flask of "suitable capacity" was specified. The remaining revisions definitely stated the size to be five hundred cc. The last U. S. P. made no reference to the kind of glass.

(*c*) *Amount of Water First Used to Facilitate the Reaction.*—The amount of water added in the first two formulas was three fluidounces; in 1880, twenty parts were added; the next three revisions specified one hundred and fifty cc. and the last revision increased that amount to two hundred cc.

(*d*) *Shaking of Flask and Mixture.*—Each of the Pharmacopœias has directed that the flask containing the mixture be shaken occasionally while the iron and

iodine were reacting. The last four have stated that the reaction could be checked, if necessary, by placing the flask in cold water.

(*e*) *Length of Time of Reaction.*—The reaction, in each formula, was allowed to go on until the solution had acquired a green color and lost its odor of iodine.

(*f*) *Filtering of Solution Mixture.*—The Pharmacopœias of 1860 and 1870 directed that the solution be filtered through a small funnel inserted in the neck of a graduated bottle, which contained syrup that had been previously heated to 212° F. In the 1880 revision the solution was filtered at once into the sugar contained in a porcelain capsule. The 1890 directions were more complicated and specified that after the solution had been heated to boiling, it be filtered through a strong double acting filter, the point of which dipped below the surface of six hundred Gm. of syrup contained in a tared dish. The next two revisions added fifty Gm. of sugar to the boiling solution of ferrous iodide and, as soon as it was dissolved, the solution was filtered into the remainder of the sugar contained in a porcelain dish. The last U. S. P. changed the quantity of sugar to be added to the hot solution to one hundred Gm., and directed that the remainder of the sugar be placed in a one thousand-cc. flask, to which the first solution was added.

(*g*) *Rinsing of the Flask and Excess Iron.*—The various revisions since 1880 have all specified that the flask and the excess iron be rinsed with water, with the exception of the revision of 1890. In that revision a mixture of twenty-five cc. of syrup and twenty-five cc. of water, which had been previously heated to "almost boiling," were used.

(*h*) *Solution of the Sugar.*—To insure the solution of the sugar the first two Pharmacopœias directed that the bottle be shaken. The next edition stated that the mixture should be stirred with either a porcelain or a wooden spatula. Such directions were omitted in 1890. In 1900 the procedure was the same as it had been in 1880. The 1900 Pharmacopœia substituted a glass rod for the wooden spatula. The last revision simply specified agitation.

(*i*) *Application of Heat.*—Heat was directed to be applied to complete the solution, only in the revisions of 1880, 1900, 1910 and 1920. And in the last two revisions it was to be applied only if needed.

(*j*) *Completion of Product.*—The last step in the process of the manufacture of the syrup according to the procedures of 1860 and 1870 was to add enough syrup to the cool solution of ferrous iodide to make the whole volume measure twenty fluidounces. After shaking it thoroughly—to mix the finished preparation—it was transferred to two-ounce vials which were then securely stoppered. In the 1880 revision the concentrated syrup was strained through linen into a tared bottle, and distilled water was added to make the finished product weigh one thousand parts; after being shaken, it was likewise transferred to small vials. The 1890 edition added enough simple syrup to make the finished product weigh one thousand Gm. The two following Pharmacopœias directed that the syrup be passed through a clean muslin strainer into a tared bottle and, after the addition of the acid, distilled water was added to make the product weigh one thousand Gm. The directions of the last revision require that the concentrated syrup be cooled to 25° C. and after the addition of the acid, enough distilled water is added to make the finished product measure one thousand cc.; after being well mixed and strained the syrup is ready to be dispensed.

Different workers have presented what they considered to be improved methods of preparation. Chapman,[1] in his report, discussed the formula offered by Squibb, which differed in that the amount of iron used was less than the U. S. P. formula. His method of preparation was slightly different too.

A cold percolation process was worked out by Hunstock.[2] It was essentially the method used for simple syrup prepared by cold percolation, the solution of ferrous iodide being used as the percolating liquid. Klie[3] used a very similar process a few years later.

Tizier,[4] after considerable work, concluded that technique was an important factor. He stated that the faster the reaction the better the syrup would be.

Cloughly[5] introduced a method that was decidedly different, in that the iron wire was first placed in a solution of potassium hydroxide to remove any oxide that might be present and would cause the solution to be darkened.

Toplis[6] substituted reduced iron for iron wire; he gave two reasons for this substitution—the first to prevent oxidation and the second to save time.

Borisch[7] modified the U. S. P. directions by requiring that the iodine be slowly added and the mixture be stirred with a bright iron spatula, which served as a catalytic agent.

Other changes have been suggested from time to time, but as they were generally intended to increase the stability of the preparation, they will be considered under the "Preservation."

UNIVERSITY OF WASHINGTON,
COLLEGE OF PHARMACY,
SEATTLE, WASH.

(*To be continued*)

PHARMACEUTICAL EVENTS IN 1776.*

BY OTTO RAUBENHEIMER.

The Sesqui-Centennial of the Declaration of Independence is duly celebrated this year in Philadelphia. Inasmuch as the A. PH. A. holds its convention this year in that historical city, a paper on a Sesqui-Centennial of Pharmaceutical Events will be in order. This is my excuse for the treatise herewith presented to the Historical Section of the A. PH. A. The arrangement is similar to my previous annual papers on Pharmaceutical Events.

GENERAL.

The Declaration of Independence adopted by The Second Continental Congress. It might be of interest to learn that Dr. Benjamin Rush was one of the signers. Benjamin Franklin sent to France as Commissioner for the United States. A very severe winter in Paris on which Lavoisier wrote a meteorological paper.

---

[1] Chapman, *Am. J. Pharm.*, 31, 559 (1859).
[2] Hunstock, *Ibid.*, 47, 390 (1873).
[3] Klie, *Ibid.*, 53, 4 (1881).
[4] Tizier, *Ibid.*, 23, 89 (1851).
[5] Cloughly, A. PH. A. YEAR BOOK, 1, 65 (1912); *Proc. Mo. Pharm. Assoc.*, 133 (1912).
[6] Toplis, PROC. A. PH. A., 58, 1258 (1910).
[7] Borisch, A. PH. A. YEAR BOOK, 21, 76 (1913).
* Section on Historical Pharmacy, A. PH. A., Philadelphia, 1926.

EVENTS PHARMACEUTICAL.

In August 1776 Congress appointed Dr. William Smith, of Philadelphia, as "Druggist to the Continental Army" with a salary of $30.00 monthly.

Congress ordered Charles Marshall of the apothecary shop at the "Golden Ball" to look after the sick and wounded in the Philadelphia hospital.

Scheele became manager of Pohler's Apotheke in Koeping, Sweden.

Ernst Wilhelm Martius (1756–1849), father of the celebrated pharmacognosist Theodore Wilhelm Christian Martius (1796–1863), completes five years apprenticeship in the Wels-Weinl Hofapotheke in Erlangen.

Apothecary-General created in the Revolutionary Army, reënacted in 1789, abolished 1812, revived in 1812 and again abolished in 1822.

Calumba came into European Materia Medica.

Daries in Leipzig studies the effect of the internal administration of Belladonna.

Perhaps the most important event, pharmaceutical and medical, is the introduction of Digitalis. It was in 1776 that William Withering (1741–99) learned from an old grandame in Shropshire that Foxglove was good for dropsy.

EVENTS CHEMICAL.

Lavoisier appointed superintendent of saltpeter and gunpowder manufacture in France.

Priestley as librarian of Lord Shelburne (1772–79) finds plenty of time for chemical investigations.

Frederick the Great, King of Prussia, makes the Swedish chemist Bergmann a tempting offer to join the Berlin Academy of Sciences, which is refused, however. Scheele corrects Baumé's Report that Aluminum Silicate is formed by fusing together SiO_2 and NaOH.

EVENTS MEDICAL.

Benjamin Rush, 1776–78 Surgeon-General Medical Department Continental Army.

John Hunter becomes Surgeon to the King of England.

Scarlatina pandemic in both hemispheres, 1776–1805. Jasser, Prussian Army Surgeon, operates successfully on mastoid.

Cruikshank investigates the reunion and regeneration of divided nerves. Friedrich Anton Mesmer practices in Vienna. Ergot used by midwives in France; in 1777, Dr. J. B. Desgranges of Lyons brings it into regular medical practice.

FOUNDATION OF SOCIETIES AND LIBRARIES.

Societé royale de Médicins, in Paris, abolished 1792 by the French Revolution. Medical Library of the New York Hospital.

EDUCATIONAL EVENTS.

Louis Bernard Guyton de Morveau (1737–1816), the founder of a national chemical nomenclature, delivers chemical lectures in Dijon, his birthplace. Hahnemann, father of Homeopathy, studied at the University Erlangen, taking his M.D. degree in 1779. Philipp Friedrich Theodor Meckel (1756–1803), of anatomy fame, studies at Strassburg.

Thomas Fowler, apothecary of York, studies medicine at Edinburg, taking his M.D. degree in 1778. Maria Theresa of Austria abolishes torture of criminals. Laura Maria Catrina Bassi-Varati, who took the double doctorate in Philosophy and Medicine at the University of Bologna, becomes Professor of Medicine there.

INVENTIONS AND DISCOVERIES.

Oxalic Acid by the oxidation of sugar with nitric acid—therefore its name "Zuckersäure"—independently by Scheele and Bergmann.

Hydrogen from Zn and NaOH independently by Scheele and de Lassone.

Uric Acid in urine and calculi by Scheele and Bergmann. Hippuric Acid in the urine of cows and camels by Hilaire Marie Ronelle. At first thought to be benzoic acid.

Borax discovered in Lagone di monte rotondo by Herbert Franz Hoefer, manager of the Court Pharmacy in Florence. Thus an apothecary became the father of the Borax industry in Italy.

Priestley describes N_2O and CO_2. Eudiometric Analysis of CH_4 by Volta.
Spielmann explains the fermentation of milk and formation of Kumys.
Wm. Cruikshank discovers that severed nerves will again grow together.
Lavoisier determines approximately O and CO_2 content of air.
Lavoisier observed that the combination product of the diamond was CO_2 only.
Lavoisier discovers that all nitrates contain oxygen.
Matthew Dobson proves that the sweetness of urine and blood in diabetes is due to sugar.

BORN—1776.

CHEMISTS.

Gerard Troost (1776–1850). This American chemist was born in Holland, studied chemistry, geology and allied sciences at Leyden obtaining the M.D. degree, and at Amsterdam where he obtained the Pharm. Mag. degree. In 1810, he settled in Philadelphia and, in 1812, he was one of the founders and first President of the Academy of Natural Sciences. From 1821 to 1822, he was the first professor of pharmaceutical and general chemistry at the Philadelphia College of Pharmacy. In 1827 he went to Nashville, Tenn., helped to found the University and became professor of chemistry, geology and mineralogy. Here he died in 1850. An important zinc mineral (anhydrous zinc silicate) found near Franklin, N. J., is named Troostite after him. Further particulars can be found in "The First Century of Philadelphia College of Pharmacy and Science, p. 397 and in Smith's "Old Philadelphia," p. 82.

Amedeo Avogadro (1776–1856), Italian chemist and professor of mathematics and physics at the University of Turin since 1820. The first to demonstrate that the molecules of many elements are composed of more than one atom.

PHYSICIANS.

Carl Friedrich Burdach (1776–1847), German professor of anatomy and physiology at Dorpat, Königsberg and Breslau. His name survives in the "Column of Burdach."

Thomas Hubbard (1776–1838), American physician and statesman.

BOTANIST.

Christian Gottfried Nees von Esenbeck (1776–1858), born in Reichenwald in the Odenberg, studied since 1796, in Jena. In 1817 he became professor in Erlangen, 1818 in Bonn and from 1830–1848 in Breslau. Taking part in the revolutionary action in 1848 in Berlin he lost his professorship, retired to Breslau, where he died in destitute circumstances; thus ended the life of a celebrated botanist and naturalist!

DIED IN 1776.

PHYSICIANS.

Robert James (1703–1776), practiced in Sheffield, Litchfield, Birmingham and finally in London; originator of the famous James' Fever Powder.

Anton de Haen of the Hague (1704–1776), pupil of Boerhaave and a colleague of van Swieten and associated with him in the foundation of the celebrated Vienna School of Medicine.

Theophile de Bordeu (1772–1776), anatomist at University Montpelier; one of the originators of the doctrine of vital force.

SCIENTIST.

David Hume (1711–1776), English sceptical philosopher and classic historian.

BIBLIOGRAPHY.

PHARMACOPŒIAS AND FORMULARIES.

German translation of the Swedish Pharmacopœia published in Leipzig. I might mention the two oldest national pharmacopœias, *i. e.*, Danica, 1772 and Svecica, 1775. Besides the Pharmacopœia Helvetica, 1771, and the American Pharmacopœia by Dr. William Brown in 1778.

Dr. Jakob Christian Traugott Schlegel: Teutsches Apothekerbuch based upon Pharm. Danica.

BOOKS.

Joseph Priestley: "Experiments and Observations on Different Kinds of Air." 2nd. London.

Prestwich: "Dissertation on Poisons." London.

Magellans: "Artificial Mineral Waters."

John Morgan: "Pamphlet on Inoculation" (now a very rare and highly priced medical curiosity).

William Cullen: "First Lines on the Practise of Physic."

Withering: "Botanical Arrangement of All the Vegetables."

Adam Smith: "Wealth of Nations;" this established Political Economy as a separate science.

J. C. Gehlen: "Erläuternte Experimental Chemie." Leipzig. German translation of "Baumé Chymie Experimentale et Raisonée."

Joh. Christ. Wiegleb: "Neuere Begriffe von der Gährung."

C. J. Mellin: "Praktische Materia Medica." Altenburg.

Haller: "Bibliotheca Medicinae Practicae." Basel 1776–78.

J. Andr. Murray: "Apparatus Medicaminum." 6 vol. Göttingen. 1776–1802.

J. J. von Pleuck: "Doctrina de Morbis Cutaneis." Vienna.

Carl Linnaeus: Amoenitates Acadameicae". 7 vol. Holmiae, 1749–1779.

Daries: "De Amygdalis et Oleum Amarum Aethereo." Lipsiae.

P. R. Vicat: "Matière medicale tirée de Halleri Historia Stirpum Helvetiae." 2 vol. Bern.

Macquer: "Memoires 1772–1776." Macquer: "Dictionaire de Chimie 1776–78."

Jourdain: "Essais sur la Formation des Dents Paris."

THESES.

M. L. Knapp: "Dissertation on the Properties of Apocynum Cannabinum," Philadelphia.

Joh. Friedr. Blumenbach: "De generis humani varietato nativa," Göttingen.

P. J. A. Davies, "De Atropa Belladonna," Lipsiae.

PAPERS.

Fothergill: "Discourse on Facial Neuralgia," published by *Med. Obs. Soc. Phys.*, London, 1771–76.

CONCLUSION.

Let me hope that these Sesqui-Centennial Pharmaceutical Events in connection with the Sesqui-Centennial at Philadelphia will stir up a little more interest in that much neglected subject History of Pharmacy. It was Goethe who rightly said, "The History of a Science is Science Itself."

"STOP, LOOK, LISTEN!"*

BY JOHN URI LLOYD.

Venturesome seems it, in the face of the well-founded science of pharmacy that then existed, for any one to voice the lines transcribed in the paper written in 1887 entitled "The Handwriting on the Wall."[1] No attempt need be made to recite details therein contained. Be it enough to state that the forecast, based on well-grounded studies in which the writer was an incident only, has been not only fulfilled, but in many directions, more than fulfilled. Is not the apothecary of the present time afar from pharmacy as then taught?

---

* Section on Historical Pharmacy, A. PH. A., Philadelphia meeting, 1926.

[1] A forecast indicating that events to come would shatter ideals and destroy processes then considered as the very foundations of the art and practice of pharmacy.

We must accept, whether the fact be pleasant or not, that the wheels of a modern Juggernaut have irresistibly rolled over him engaged in upholding old time ideals. A melancholy recollection is it to some of us.

But whoever lingers in the field, must accept that in the changed order we have responsibilities not less vital than formerly possessed by us. Altered conditions have not relieved us from our duty to the public or our families. Facts stare us in the face. Added perplexities, unforseen by any one, enmesh us. Enough has been said concerning the text we have cited from the past. "Let the dead bury their dead," is yet alive. Did not Longfellow write, "In thy journey look not backward."

May it be audacious again to venture a forecast, in that, very soon, it may be necessary not only for the practicing apothecary, but for the pharmacist teacher, the directors of our teaching institutions, as well as the authors of publications devoted to the subject of pharmacy, to "Stop, Look, Listen!"

In 1887, the lunch counter, the drink combinations and "what nots," now so prominent in many pharmaceutical establishments, where once a soda water urn and a half dozen syrup bottles were the limit, was a condition unthinkable. That innovation came insidiously, but as irresistibly as does the slowly rising tide. Indignation possessed some of us as the innovations progressed, others were humiliated not a few indifferent.

Let us of other times not be out of patience with those who, necessarily or from choice, breaking no law, have taken advantage of their opportunities as well as their needs. The elimination of the ideals of the apothecary of the past in his special directions, made it necessary for some one of more elastic thought to take his place. Business responsibilities and increased overhead expenses could not be ignored.

Let us not assume that all those who conduct these establishments are necessarily lacking in either book schooling or practical experience; that they delight in the "lunch feature" of their business. Were they not often driven to it, in self defense?

As an illustration, I have in mind the owner of a chain of stores. He is a graduate of one of our foremost institutions. His highest ambition was scientific pharmacy. Versed is he beyond question, in all that concerns pharmacy of the olden times, as well as the present. But he needs now to meet competition that in the new order of things, came to face him. Meet it he must, or perish.

Materia medica as applied to pharmacy and drug plants, was his hobby, and it may be added, is yet his delight. In a recent journey that took me to his city, as I entered his main establishment, little evidence was visible to indicate that there was here an opportunity even for filling prescriptions a physician might write. Back in a corner out of sight, stood the prescription case.

"*The Unexpected Happens,*" is an old, old saying, touching every phase of human life. Perhaps the pendulum will swing back, but if so, it cannot follow in exactly the same orbit. Never yet was the same track made by any object moving in the realms of space. Intellectual space is no exception. The human mind vibrates in curious paths.

But to the subject thus introduced. Let us be bold enough to face the unexpected, in which we in pharmacy are so deeply concerned. Participants are

we, "whether we will or not," not mere lookers on. Turn thought next, for we cannot escape the facts, to the American Medical Association as a whole, whose hand-maid pharmacy is.

When Irregularity Becomes Regularity!—Ideals of the past have there, too, been shattered. Seek the pages of America's professional book. Note that seventy years ago, the physician who in print dared advise the people regarding home care, hygiene, sanitary necessities and processes, even if it were to help them escape pernicious methods of medication, was by "the ethically pure" classed an an "irregular," a term then synonymous with "quack" or "charlatan." That was perhaps the main crime of the American "Irregulars," one hundred years ago.[1]

One may ask, "Was there a physician *excepting* the 'Irregulars,' in all this land, whose professional caste at that date would not have been lost, had he in public print attempted to advise the people regarding the treatment of ailments, or warn them against indiscretions? If so, whose voice was thus raised in secular print?

What of the Present?—At least four courageous men, occupying exceptionally conspicuous places in American medical annals, contribute daily to syndicated newspapers. Is not each doing great good in that once forbidden field? Are they not schooling the people as never before has been done? Is their advice now "quackery," more than it would have been half a century ago? Are they harming any one? Are not their daily suggestions, their warnings, their discussions concerning ailments and hygiene, designed for the betterment of the health of the people as a whole? In reply, a rejoinder might be made to this effect:

"But these men are not 'Irregulars,' they are 'Regulars!'"

So be it. If "Irregularity" has become "Regularity," to the good of the people, pity it is that it happened not decades ago. Let us not quarrel over an academic problem. Let us rather ask, "What will this turning of Fate's wheel bring first to them, and next to pharmacy?" Let us watch the swinging of the pendulum. Let us seek a reason for this revolution.

The Unexpected.—Has not the annihilation of the teaching medical colleges of America placed a great section of the American people in a deplorable condition? Are not cults swarming and thriving, as never before? Is this not the day for their harvest? Has not the destruction of the teaching medical colleges accomplished the reverse of what was expected? Did law piled upon law do more than crush the old time colleges and open the doors to "Whosoever will?" Are the people contented? If so, why this increase of diploma-mills, and aggressive cults? Comes not by these reasons the necessity for meeting these conditions by men as brave as those who have opened the doors, through the newspapers that permit them to speak to thousands? Is that, however, enough to care for the abandoned people?

What Next?—Can we not foresee in connection therewith the return of the

[1] In close touch were physicians of that day with inherited ethics from abroad, where even now the physician must be cautious if he endeavors to help educate the people. "The door post of the distinguished Vienna surgeon bore the single name 'Billroth,' in 1887." As these lines are written, the press reports that a conspicuous medical authority, Sir Wm. Arbuthnot Lane, has broken the code of ethics, and in consequence has offered his resignation as a member of the British Medical Association.

family medicine chest? Will not works on domestic or home care of the people who now, over great tracts of this country have no physician, become necessary? Will not this phase of "irregularity" of times gone by, become a duty of some one? Cannot educated physicians in authoritative positions serve by advice patients afar from themselves, better than can illiterates? Should this great field be relegated to the rising crowd of unschooled cults that need not be named? Will home cure advertisers, who can enter the field, be found asleep?

Now What of Pharmacy?—Pharmacy too, has been drawn into the whirlpool caused by the paucity of physicians, due to the wrecking of the medical colleges, an act not in any wise our responsibility. Who can deny that our pharmaceutical colleges are giving their graduates increased opportunities in pure science, as well as in technical directions? Our professors are qualified to the extreme. Ambitious are they to serve to the utmost of their ability, unselfishly devoting themselves to their responsibilities, in that pharmacy graduates may be qualified beyond reproach. Equipped as never before are the laboratories of our teaching institutions. Neither pharmacy nor pharmacists are educationally at fault. But does it not behoove one and all to face present conditions, be they pleasant or the reverse? Taking the record of the past, can we not forecast therefrom the probable future, and meet it as bravely as have the aforenamed medical authorities who, defying old time restricting ethics, have publicly turned their pens to the education of the people in health conservation, by means of the American newspaper press? The question arises, should either legitimate pharmacy that is of service to the people, or liberty, that serves one and all, be throttled?

Would not advice to a community distant from a physician's care be better in the hands of a qualified pharmacist, than in those of an advertising, far-distant artful incompetent? The pharmacist can at least advise *what not to do*, in the line of harmful or needless medication. The question is, What constitutes a qualified pharmacist?

Does the curriculum of our colleges of pharmacy meet present needs and conditions? Does it fully serve the needs of the people, or are we threshing much straw that long ago lost its grain? Is it not time, for one and all, to *Stop, Look, Listen*?

The foregoing paper was read by former President, A. PH. A., James H. Beal; in commenting thereon, after conclusion of the reading, he said that this paper recorded one of the most remarkable prophecies that has ever come to his attention; that Professor Lloyd foretold, in 1887, what we have seen come to pass. He advised the reading of the remarkable paper. "Excesses," he said, "have a natural tendency to correct themselves by generating progress in the other direction. In attempting to raise the teaching and practice of medicine too quickly there have been brought into existence a great number of cults and methods of quackery, which otherwise would not have come into being, so that in the survey of the whole field of medicine when we measure up the advantages of improvement in medicine we must also consider the opposite—the irregularities which have come into existence in connection with these cults and some religious methods of treating disease." He said that his Florida home is in a district comprising a strip of land 12 to 42 miles wide and 140 to 150 miles long—there is no large town, but there are dozens and, perhaps, hundreds of hamlets, turpentine mills, lumber mills, thousands of isolated homesteads, and he asked, "In all that territory, how many physicians?"—"One!" "How many registered pharmacists?"—"None!" "How many adherents of the cults?"—"Thousands!"

OUR PROBLEMS.*

BY SAMUEL S. DWORKIN.

I wish to emphasize the impossibility of covering all the problems and conditions affecting our profession. I will present only a few, with the hope of arousing discussion and discovering a remedy.

PRESCRIPTION DEPARTMENT.

The prescription department, as was shown in my reports at the New York State conventions, is suffering from "Too many proprietaries." My investigation disclosed that over 75 per cent of the prescriptions compounded throughout the State call for proprietary products of one kind or another, in some localities as high as 95 per cent. For the last two years, by the collection of data on the question of "Increase or Decrease" of prescriptions in drug stores, I have found a noticeable decline, fewer prescriptions being filled throughout the country generally.

This condition is due not only to physicians prescribing proprietaries (the result of such prescribing being well known, as it creates "self medication" with increase in "counter sales" of such remedies), but is also due to the tremendous increase in hospital activities, private sanitariums owned by physicians, the development of "Medical and Health Centers," the growing popularity of the "drugless treatment" by various cults, the medical advice given by practically every daily and monthly publication in the country, the modern modes of living and sanitation, office dispensing, treatment with X-rays and other medico-mechanical inventions. The so-called "Needle Treatments" are also contributors to the condition of fewer prescriptions as is also the increase in the sale of strongly advertised home remedies.

PRICING OF PRESCRIPTIONS.

The pricing of prescriptions is also unsatisfactory and a nation-wide agitation to adopt more uniform pricing would be of great benefit to pharmacy.

NEW REMEDIES.

The problem of New Remedies must be solved by a National Committee on New Remedies, recognized by the Government. Until that time our shelves will be packed with so-called scientific preparations manufactured in this country or imported from various countries, many of which will be recognized as "Old friends in new dresses."

PROHIBITION.

The Effect of Prohibition upon Our Profession.

It has resulted in bringing dishonor upon our profession.
It has produced two standards of ethics and morals.
It has resulted in unwilling violations of law.
It has caused abnormal increase in number of new drug stores.
It has produced a vast number of new remedies.

* Read before Section on Commercial Interests, A. PH. A., Philadelphia meeting, 1926.

It has destroyed our own manufacturing of galenicals.

It gave "a bartender's tone" to the druggist.

It has created a new definition of a pharmacist—a "bootlegger."

It produced an influx in the colleges, "with the result of an over-production of pharmacists and naturally the non-absorbed over-stock is looking for business creating the condition of "too many drug stores."

In short, it has shattered our profession.

It changed the old-time apothecary shop to an up-to-date establishment with a "soft drinks" department.

It gave the pharmacy free publicity with head lines on the front pages.

It gave us a new class of patrons.

It created an ill-feeling between the proprietor and the clerk.

It lowered the professional dignity of the pharmacist.

It resulted in high rental of stores.

It created liquor selling jobbers, with results known to the retail drug trade.

It demoralized our profession.

TOILET ARTICLES DEPARTMENT.

Government statistics show that the consumption of toilet goods is increasing rapidly each year. In 1920 the Secretary of the Treasury reported $750,000,000 spent for toilet goods. Of this $125,000,000 was spent in drug stores, $315,000,000 in department stores, and $310,000,000 through other channels, as 5- and 10-cent stores, beauty parlors, jobbers, barber supplies, mail order houses, etc.

Another statement was made that once upon a time the retail druggists of the United States sold more than 65 per cent of all the toilet goods sold in this country! To-day the retail druggists sell only between 35 and 38 per cent. Personally I am convinced that this termendous drop in the second statement and the very small percentage in the first are due to our neglect.

The average retail pharmacist has neglected and is neglecting his toilet article department, not only by stocking a poor assortment of goods, but also by poor display of the goods to be sold. Another very important factor is in lack of knowledge of the goods for sale. To sell toilet articles you must understand them, their purposes, uses, etc.

Interesting facts regarding beautification was stated by the cosmeticians at the Chicago National Convention—namely, that more than 500,000 men use cosmetics secretly. Face powder eclipses gunpowder in National value. Women of the United States spend five million dollars a day for beautification purposes, etc.

In my opinion, women visit drug stores more often than any other store except groceries. Young women, with growing necessities, with broadening desires for all the luxuries and, nowadays, with increasing means to buy, have created a condition of possibilities for enjoying a tremendous volume of business in toilet articles.

To sell more cosmetics, you must necessarily appeal to the women who desire them. With a complete stock of one or two lines of well-known products, with a knowledge of the talking and sales points of these products, through knowledge of their uses, results will be produced.

The drug business is going through the greatest change in its history. Through development of a great variety of side-lines, soda fountains, "quick restaurants," etc., in many localities there is a spasmodic action and creation of a loss in business and desire to "increase." But this "branching out" is in many cases detrimental to the best interests of the retail pharmacist, through dividing capital, attention and, most important, service; in short, he is robbing himself of good, solid and profitable business in cosmetics, toilet articles and perfumes.

Although perfume shops are an economic evolution, I claim that the neglect of the druggists in this department has acted as a revolution in the industry. To protect yourself against the rapidly advancing wave of chain and department stores and 5- and 10-cent establishments—as they are developing more and more, opening stores in localities of the "most traffic, absorbing the largest percentage of the buying public and selling them articles previously sold in our stores—study their methods.

When, three years ago, I, as a chairman of the Commercial Interests Committee, of N. Y. State Pharmaceutical Association reported at a State convention on the growing menace in the manufacture for these stores of 10-cent sizes of standard products, no action was taken. My report was taken as a "good story," but what is the situation to-day? You can buy the best imported lines in these stores and all the nationally advertised toilet lines are bidding for their business by getting up special packages for them.

It is too late to pass resolutions against manufacturing 10-cent sizes, as there is a very extensive demand created for small sizes, not only because of the price, but because they are convenient sizes for temporary use. A prominent five and ten cent store sells more than $3,000,000 a year of a certain 10-cent olive soap, and three or four times the amount of cold creams and tooth pastes and other toilet articles. As to the manufacturer, many claim this is a profitable business and a good medium of advertising.

I do not favor the 10-cent size in perfumes and face powders, as it cheapens the brand, but the lure of big business is so great that the manufacturers are overlooking this feature.

There is only one thing that will protect the independent retail pharmacist and bring more customers to his store with a possibility of selling them other products, and that is, to adopt the chain stores' methods—stocking more toilet articles in popular sizes.

Many will object, claiming this to be turning a drug store into a five and ten cent store. I do not believe it will. Establishing cigar agencies in drug stores, covering the front of the store with well known "Red Signs," thus changing the appearance of a drug store to that of a chain cigar store, which is the mother of the first "Drugless Drug Store," is more dangerous and detrimental to our stores than selling 10-cent sizes of merchandise.

FUTURE DATING.

This problem is of importance, as more and more manufacturers are adopting this method, which I claim is detrimental to the interest of the retailer. It is a bait to buy heavier. It is an inducement which creates a dead stock of merchan-

dise. It robs the small retailer of the possibilities of carrying a variety and in many cases is a direct cause of cut prices.

Retail pharmacists should accept future dating only on items such as Peroxide, or Milk of Magnesia, as certain sections of the country have to stock their requirements for the winter, in advance, or on orders placed for holiday goods, as gift boxes, etc.

Time will not permit me to cover more, hence, I will finish this little paper with another problem which is also of importance.

THE DISTRIBUTION OF SAMPLES.

As we know, vast quantities of samples distributed through our stores are given away to children. This creates a competition not only in prices but in the number of samples given to the child—many sales are lost because of shortage of samples. The children and even adults travel from one store to another, samples constituting the stunt of a bargain. Hordes of children invade drug stores with the demand for samples, thus creating dangerous conditions, because of the responsibility incurred.

ABSTRACT OF DISCUSSION.

Chairman Hunsberger said that Mr. Dworkin had brought out some of the pharmacists' problems which require consideration.

Mr. Goeckel said the writer did not take into consideration that many of the younger doctors were in the Army (during the late war) and the older ones were doing the prescribing. He was of the opinion that pharmacists were somewhat at fault in the matter of insisting that pharmacists be employed in hospital dispensaries. The young doctor studies the Pharmacopœia and National Formulary, when he comes to the hospital his desire is to prescribe according to the standards, but he finds the shelves filled with ready-made preparations and he soon falls into the way of using these. This situation would be largely corrected if pharmacists were in charge of the hospital pharmacy and dispensary.

Mr. Schmitter referred to his experience as a former hospital apothecary in saying that the preparations used in the dispensaries were largely dispensed by number; those who dispense these preparations are minor employees; the pharmacist and an assistant handle the work.

Mr. Smith said that in Brooklyn graduates in medicine were supplied with copies of an "Epitome" of the National Formulary and U. S. Pharmacopœia, and the pharmaceutical organizations endeavor to have physicians prescribe. Three or four thousand copies are annually distributed among physicians of New York and Brooklyn. Other propaganda is also carried on and this work has been conducive to developing the writing of prescriptions by physicians and those in hospitals prefer to prescribe according to the U. S. P. and N. F. rather than by number. The work carried on by the pharmaceutical organizations in and about New York and Brooklyn has proven to be well worth while.

ACADEMY OF MEDICINE JOINS BETTER BUSINESS BUREAU.

The Academy of Medicine of Toledo and Lucas County has become a member of the Toledo Better Business Bureau, and has completed all necessary affiliations to protect the economic interest of its members. The Better Business Bureau movement has spread throughout the country until there are now about forty-five bureaus in various cities. Its objects are to prevent deception to and increase public confidence in advertising; to reduce unfair competition and to educate the public to understand the practice of honest business. Among other things, it has recommended to the newspapers and other advertising columns certain standards in medical advertising, and has therefore been of assistance in eliminating from a portion of the press the misleading statements of medical quacks.

It will readily be seen that there is necessity for giving consideration to business in medical practice, as in all other professions and arts—to transact business honestly and fairly applies to trades as well as professions.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

HOW MUCH SHOULD A RETAIL DRUGGIST SPEND FOR ADVERTISING?

In 1926 Howard Hobart's drug store did a business of slightly more than $26,000. A check showed that this total represented 71,242 individual sales, indicating an average sale amounting to about thirty-six cents. Since profits averaged 8.3 per cent of sales, in 1926, the average profit on each sale was thus about three cents.

The problem which puzzled Mr. Hobart and which, incidentally, puzzles a great many other druggists in similar situations was, how much could he afford to spend to develop new business?. How much could he afford to spend for advertising? He had heard, as many druggists have, of great chain organizations which spend two or three per cent of sales for advertising and promotion.

What Mr. Hobart wondered was how two or three per cent happened to be the figure chosen. If two or three per cent produced good results would not five or six per cent produce better results? But a little water makes grass grow while a flood washes it away. At what point does advertising change from an energizing creator of business to a devastating destroyer of profits?

To find the answer Mr. Hobart went back to the primary purpose of advertising, or any other business-getting effort. Any man should be willing to spend one dollar to make two dollars because his expenditure of one dollar results in a net gain of one dollar. Transferring this idea to Howard Hobart's drug store, we find him willing to spend for advertising and promotion part of his profits from the additional sales this advertising and promotion may produce because the result is a net gain to him. This is the basis upon which Howard Hobart can set a definite objective for every promotion effort he makes.

Suppose, for instance, he has just stocked a new iodine preparation. It costs him fifteen cents and sells for a quarter. Profits after expenses are paid are about two cents on each bottle. Howard Hobart wants to popularize this new preparation because he believes that if more people can be made acquainted with its merits more sales are bound to result, not only for this product, but also for other merchandise he sells. In other words, the new preparation can be used as an attraction to bring new people to the store. How much can he afford to spend to popularize this new preparation and bring new and old customers to the store?

Within easy walking distance of his store are 1000 desirable customers.

* Instructor of Merchandising, Wharton School of Finance and Commerce, University of Pennsylvania, Lecturer on Business Administration, Philadelphia College of Pharmacy and Science.

Some are trading with him now and others are not. Naturally none are buying the new iodine product from him because this is the first time he has stocked it. Therefore, information about the preparation is news to the entire 1000 people.

To mail to these 1000 people Government postal cards printed with a message about the new compound would cost $10.00 for postage, $5.00 for printing and $4.00 more for addressing and mailing, a total of $19.00. (I have assumed that Mr. Hobart has compiled his own mailing list.) What results must this $19.00 expenditure produce to be profitable?

Howard Hobart does a little more figuring. His average sale is thirty-six cents, at a profit of three cents. However, 71,242 such sales were not made in 1926 to 71,242 different individuals. Many people bought more than once; in fact a check of charge customers' records showed the average of these people to be about 40 visits a year. That is to say, in a single year, he estimated the purchases of a regular customer amount to $14.40 with a profit of about $1.20 to him.

Thus if his $19.00 expenditure for postal cards brings him sixteen customers who continue to buy from him for a year, his advertising expenditure has more than paid for itself. Add to this his direct and immediate profits from the sale of the iodine preparation.

When many druggists are approached with an advertising proposition of this kind, their most frequent reaction is "Oh, it's just a waste of money to send out postal cards of any kind of advertising by mail. I never read any of that kind of thing; I throw out a basketful of advertisements every day."

Curiously enough, the druggist is right! Most advertising matter does go straight to the waste basket with scarcely a passing glance. Notice that in the example I have just cited 984 of the 1000 postal cards Howard Hobart had printed, addressed and mailed so carefully are assumed to have gone straight to the waste basket without being looked at. But the sixteen—less than 2 per cent of the total—which escaped this fate were more than sufficient to make this advertising effort profitable. That is what happens in all advertising. Of necessity, a large part of it must fall on infertile ground, but the astonishingly small proportion which does take root and produce results is frequently more than sufficient to make the whole effort profitable.

That is the standard by which a retail druggist should measure his own efforts to promote his business! What results must this expenditure produce in order to be worth while and profitable to me?

A MONTHLY CALENDAR WITH REAL SELLING VALUE.

Most calendars nowadays contain a beautiful and usually appropriate picture, a picture which excites admiration and appreciation when the recipient looks at it late in December or early in January. But with most people the longer they see an object the less conscious are they of it. Few can tell without looking the color of the ceiling in the office in which they may have worked for years, or how many steps there are in their own cellar-way. Exactly the same principle operates to make people less and less conscious of a calendar picture which has been on

view for a long time, no matter how attractive that picture was to them in the beginning.

Some druggists have met cleverly this disadvantage of yearly calendars by designing a calendar in which the calendar for the month, illustrations and text are all on one sheet. When February 1st comes the recipient of the calendar perforce must tear off the entire sheet, thus exposing not only a new monthly calendar but also new illustrations and text. It requires no particular imagination or effort for a druggist to work out ideas about merchandise and services which are appropriate for him to advertise each month through the year. By printing these messages and whatever illustrations may accompany them on the same page with the appropriate monthly calendar, the druggist automatically insures that the merchandise he advertises will be brought to the attention of the people to whom he gives his calendars at the most appropriate time of the year.

SEASONABLE DISPLAYS FOR MAY AND JUNE.

House cleaning aids	Perfumes and toilet waters
Sponges and chamois	Fountain pens and mechanical pencils
Insecticides and germicides	Stationery
Moth balls, camphor, cedar flakes	Cameras and photographic supplies
Clothes bags	Vacuum bottles
Wedding and graduation gifts	Vacation needs

POISONS AND POISONERS.

As a retrospect of fifty years ago, the *Chemist & Druggist* republishes an article printed in that publication 50 years ago; liberty is taken in reprinting it as an historical item.

"Among the special treatises on poisons the most interesting as it is also the most complete, is that attributed to Dioscorides, celebrated physician of Cilicia, who lived about the commencement of the Christian era. In this treatise, which forms the sixth, seventh and eighth books of his great work on Materia Medica, we meet with the first allusion to arsenic. This substance, which has only been properly studied in modern times, was then more commonly known as sandarac than as arsenic. It was generally obtained from Mysia, on the Hellespont, in the form of compact yellow pieces, heavy and scaly. It was orpiment, or the yellow sulphide. It is somewhat curious, however, that we do not find white or sublimated arsenic referred to more precisely, as we read in Pliny that the properties of the orpiment are more developed if it is burned in a new earthenware vessel until it changes color. (*Torretur ut validius prôsit in nova testa donec mutet colorem,* Bk. 34, ch. 18.) Discorides also remarks that when calcined with charcoal the sandarac changes its color. So that we may gather that under the name of arsenic the ancients understood sometimes the sulphide and sometimes the white arsenic. Clearly, the poison was known to them, and no doubt was employed. It was the prompt and terrible agent of those secret dramas of the imperial palace, the scandalous mysteries and odious machinations of which are related by Tacitus. The palace of the Caesars was as well furnished as the laboratory of Locusta. There, in a remote apartment, under the eyes of an attentive and suspicious master, with poor slaves for the victims, were made those *experientiae in anima vili* of some new compound destined to render a Claudius or a Britannicus prematurely immortal."

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

Wilford Harrison, President, Wichita Falls, Texas. J. W. Gayle, Treasurer, Frankfort, Ky. W. P. Porterfield, Chairman of Executive Committee, Fargo, N. D. H. C. Christensen, Secretary, 130 N. Wells St., Chicago, Ill.

ACTIVE MEMBER STATES.

Alabama	Iowa	Nebraska	South Carolina
Arizona	Kansas	Nevada	South Dakota
Arkansas	Kentucky	New Hampshire	Tennessee
Colorado	Louisiana	New Jersey	Texas
Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	North Carolina	Vermont
D. of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming
Indiana	Montana		

DISTRICT MEETINGS.

DISTRICT NO. 6.

A very interesting and helpful meeting of representatives of the boards and colleges of District 6 (Arkansas, Kansas, Missouri, Oklahoma and Texas) was held at the Kansas City Athletic Club, Kansas City, Mo., on April 12th and 13th. Dean W. F. Gidley, of the University of Texas College of Pharmacy, presided for the college association and A. H. King, Vice-President and Chairman of N. A. B. P., District 6, presided for the boards.

One of the outstanding features of the meeting was the unanimous adoption of a resolution to be recommended to the N. A. B. P. and A. A. C. P. conventions in St. Louis that the four-year course in pharmacy be adopted by schools of pharmacy and boards of pharmacy to become in force not later than 1930. This conclusion was reached after a study and a discussion of the Dr. Charters' book *Basic Material for a Pharmaceutical Curriculum*. Committees on Resolutions were appointed by both the boards and the colleges to study the deliberations of the meeting when the minutes are assembled and draft the final resolutions to be recommended to the national bodies at convention.

DISTRICT NO. 3.

Bernard M. Keene of Indiana, N. A. B. P. Vice-President and Chairman of District 3, has called a joint meeting of the representatives of colleges of pharmacy and boards of pharmacy, to be held at the Lincoln Hotel, Indianapolis, Ind., Thursday and Friday, May 5th and 6th. The district is comprised of Ohio, Kentucky, Indiana, Illinois, Michigan and Wisconsin.

Indications at the time this goes to press are that every board of pharmacy and every college in the district will be represented at that meeting. The program prepared is similar to that of the meetings recently held in other districts and the same procedure will be followed in discussing the topics to be presented.

LEGISLATIVE NEWS.

Delaware.—The good news has been received that Delaware has passed two big pieces of pharmacy legislation at the recent session of the legislature—a college prerequisite law and an ownership bill. The same became effective March 30, 1927, the date of passage.

Idaho.—The Idaho Legislature recently passed a law establishing a state college at Pocatello which is to be known as the "Southern Branch of the University of Idaho." The "Idaho Technical Institute" becomes a part of the college. It is reported that this legislation will permit the school to give a course in pharmacy in accordance with the standards of the American Association of Colleges of Pharmacy and make it eligible for membership in that body.

Iowa.—Although the Ownership Bill died in the "Sifting Committee" of the House, Iowa has not given up hope. Secretary Eaton says, "Two years from now, we will put it over."

Kansas.—In accordance with a law enacted at the recent session of the Kansas Legislature, the Board of Pharmacy will turn over one-tenth of its receipts to the State Treasury to re-imburse the State for the expense of auditing the books of the Board. Heretofore the State has borne this expense. This measure received the support of the Kansas Board, and it is felt that the enactment of this law will check further efforts of politicians in trying to pass a consolidation of boards law.

Maine—Is to be congratulated on its success in passing a bill amending the pharmacy law to require high-school graduation for entrance to examination. Last year the law was amended to require two years of high school. It is hoped that next year will bring the college prerequisite. The bill recently passed also defines the terms pharmacy, drugs, drug store, etc., and becomes effective 90 days after passage.

Michigan.—The Ownership Bill passed the Michigan Senate with but three opposing votes. The measure is now before the House of Representatives.

North Dakota—Was successful in securing the enactment of several amendments to the pharmacy law of that State which, it is reported, will strengthen its enforcement.

One of the amendments not only designates who may engage in the selling and dispensing of drugs, medicines, etc., but also provides that "Every store or shop where drugs, medicines or chemicals are dispensed or sold at retail, or displayed for sale at retail for medicinal purposes, or where prescriptions are compounded shall be deemed a 'pharmacy' or 'drug store.'" The law also prohibits the use of the terms, "drugs," "drug store," or "pharmacy" in any manner, for advertisement by circular or poster, sign or otherwise when used in describing or referring to a place of business unless such place of business be at all times in charge of a registered pharmacist, or during the temporary absence of the registered pharmacist, in charge of an assistant pharmacist. The absence of the registered pharmacist, or of the assistant pharmacist during his temporary absence, is made *prima facie* evidence of violation of the law.

The prerequisite section of the pharmacy law has had a provision added which requires that after January 1, 1930, an applicant for examination as registered pharmacist must have graduated from at least a three-year course at a school or college of pharmacy, maintaining standard equivalent to the requirements for membership in the A. A. C. P., and must, in addition have had at least one year of service and experience in a retail pharmacy under a registered pharmacist.

These are the outstanding features of the new law. There are several other changes having to do with apprentices and apprentice registration, increase of registration and renewal fees and per diem fee of board members, etc.

The new provisions become effective July 1, 1927.

STATE BOARD OF PHARMACY NEWS ITEMS.

Arizona.—The largest class examined in the history of the Arizona Board appeared before the 47th semi-annual meeting held at the State House in Phoenix on April 13th, 14th and 15th. Fifty-five candidates took the board examination but the results are not yet available. Fifteen candidates appeared for registration by reciprocity and on experience.

Fred H. Brown of Winslow and Boyd Laird of Nogales have been appointed to succeed the retiring members, A. G. Hulett of Phoenix and A. P. Martin of Tucson. F. W. Ritter was

elected *President* of the new Board and E. M. F. Ivey, *Vice-President*. Arthur G. Hulett was reëlected *Secretary-Treasurer* and *Inspector*. Mr. Hulett is entering his twenty-fifth year as secretary and served as a member of the Board for twenty-four years, from 1903 to 1927.

Delaware.—Only one out of ten candidates taking the April examination for registration as pharmacist was successful; four of the eight candidates taking the assistant examination also passed. As the prerequisite law recently passed became effective on March 30th, only applicants who are graduates of recognized colleges of pharmacy will be admitted to future examinations.

District of Columbia.—The Board is in the midst of its quarterly examination as this issue goes to press. Sixty-two applicants for registration are being examined.

A. C. Taylor, President of the D. C. Board, was recently elected Secretary of the D. C. Retail Druggists' Association.

Other state boards are requested to send any available information as to court decisions on the sale of aspirin by others than licensed pharmacists to Secretary W. T. Kerfoot, Jr., 7th and L Sts., N. W., Washington, D. C.

Indiana.—Seventy-two candidates were examined at the April meeting. Grades will be assembled at a meeting to be held May 4th and 5th and results published later.

Russell Rothrock of Mt. Vernon was recently elected President of the Board, and John A. J. Funk of Galveston was elected Secretary.

Iowa.—Six of the twenty-eight candidates taking the March examination were successful.

Kansas.—A. H. King of Manhattan and P. H. Klinkenberg of Ottawa, have been re-appointed by the Governor as members of the Kansas Board of Pharmacy.

Mr. Klinkenberg was appointed last year to fill the unexpired term of Roy Taylor, resigned, and although he was not an applicant for re-appointment, he consented to accept the same when the Governor tendered him the appointment. A. H. King succeeds himself.

Louisiana.—The next meeting of the Louisiana State Board of Pharmacy will be held in New Orleans at Tulane University, May 18th and 19th. A large class is expected, due to the fact that this is the last year in which applicants may present themselves for examination without being graduates of a recognized college of pharmacy.

The forty-fifth annual meeting of the Louisiana State Pharmaceutical Association is to be held on May 10th and 11th at the Roosevelt Hotel, New Orleans.

Maine.—One candidate out of the thirteen taking the April examination at the State House in Augusta was successful in passing. Hereafter entrance to examination for registration as pharmacist will be limited to high school graduates, as a result of the amendment to the pharmacy law recently enacted.

Maryland.—The regular mid-year meeting of the Maryland Board of Pharmacy will be held on Wednesday and Thursday, June first and second, at the University of Maryland, Baltimore.

Minnesota.—Thirteen candidates were granted registration as pharmacists and twenty-one were registered as assistant pharmacists as a result of the examination meeting held on April 22nd. The following applicants were granted reciprocal registration: Henry N. Elvig, of Illinois; Chas. A. Fraser, Henry R. Kruse and Alvin G. Rollins of Iowa; Karl E. Bleser and Glenn R. Scott of South Dakota; W. G. Tanner and Alex A. Dinndorf of Wisconsin.

Montana.—At the spring examination held on April 13th and 14th, eighteen candidates appeared before the board and eleven of this number were successful in passing. The next examination will be held in October.

Missouri.—The Board of Pharmacy announces that the next examination meeting will be held in St. Louis on June 13th and 14th and that the fall meeting will be held in St. Joseph, Mo., on September 26th and 27th. Those desiring further information should communicate with the Secretary (see Board roster in the Advertising Section of this issue of the JOURNAL).

Nebraska.—The Department of Public Welfare announces that the spring examination in pharmacy has been set for June 14th to 17th, inclusive, to be held at the Creighton College of Pharmacy, Omaha. Completed applications should be on file with the Department two weeks prior to June 14th.

Oklahoma.—C. M. Anderson, Secretary of the Oklahoma Board, has been re-appointed by Governor H. S. Johnson.

Pennsylvania.—The Board of Pharmacy reports that ninety-seven pharmacists' certificates

and sixty-four assistant pharmacists certificates were issued during the quarter ending March 31, 1927.

South Dakota.—The Board of Pharmacy announces its next meeting on June 7th, 8th and 9th at Brookings.

After this examination, all candidates for entrance to examination must have four years of experience and be graduates of a four-year high school course or prove equivalent credits; or must be graduates of an approved college of pharmacy and furnish proof of one year of practical experience. This is in accordance with the amendments to the pharmacy law enacted at the recent session of the legislature.

Virginia.—The Virginia Board announces that its annual meeting was held on Monday, April 25th at Richmond, Va. Report of officers elected will be published in our next issue.

The annual report of the Virginia Board of Pharmacy shows that 53 candidates were examined during the year for registration as pharmacist and that 39 successfully passed and were granted certificates. Eleven pharmacists from other States were granted reciprocal registration, making a total of 50 new registrants. The total number of registered pharmacists in the State is 1351; assistant pharmacists, 106. Number of women pharmacists registered, 23.

Wisconsin.—The State Board of Pharmacy concluded its examination on April 23, 1927, after examining the largest class of applicants that has appeared in the 44 years since the Board was created. Out of 195 candidates, 100 were successful.

This being the annual meeting of the Board, the following officers were elected for the ensuing year:

Gustav V. Kradwell of Racine, *President;* Henry G. Ruenzel, of Milwaukee, *Secretary.*

The next examination will be held in Madison on Monday, July 18, 1927. No applications will be accepted after July 1st.

A PLEA FOR THE ADOPTION OF THE QUARTERLY SYSTEM BY COLLEGES OF PHARMACY.*

BY A. RICHARD BLISS, JR.[1]

The suggestion offered in Article VI, paragraph 4 of the By-Laws of the American Association of Colleges of Pharmacy; the activities of the writer in a recent movement initiated and sponsored by The City Club of Memphis, a civic organization, for the adoption of an "all year round school" for the public schools of Memphis; and a study of the quarterly system now under way at the University of Tennessee College of Medicine, College of Dentistry and School of Pharmacy are the influences that prompted the writing of this paper.

The American Medical Association and the Association of American Medical Colleges have definitely approved the quarterly system for Class A medical schools. The American Association of Colleges of Pharmacy has indicated its approval in the article of its By-Laws referred to above. A number of colleges, universities and public school systems have adopted the quarterly plan of continuous operation. The plan has evidently passed the experimental stage, and its feasibility and advantages definitely established.

A casual perusal of recent pharmaceutical literature convinces the reviewer that, while page upon page of discussion appears concerning the extension of the basic course in pharmacy from two years to three, four, five and even six years,

---

* Section on Education and Legislation, A. PH. A. Philadelphia meeting, 1926.

[1] Dean of the University of Tennessee School of Pharmacy; Chief of the Division of Physiology and Pharmacology in the Colleges of Medicine and Dentistry and School of Pharmacy, Memphis, Tennessee.

relatively little consideration has been apparently given that important factor "Father Time" from the economical and personal standpoints of the pharmacy student. Our good friend and colleague Doctor Gregory of the College of Pharmacy of the University of Buffalo stands almost alone as the inquisitor for "Father Time." An examination of current catalogs of the colleges of pharmacy shows that very, very few, if any, pharmaceutical institutions have adopted, are promoting, or are even seriously considering the time-saving quarterly system.

At the start permit the writer to stress the fact that he is not advocating any curtailment of the actual time in clock hours prescribed for the basic course in pharmacy.

This paper purposes to show the following:

First.—That an individual should have the right and the opportunity to progress as rapidly and as far as his ability will permit, unhampered by artificiality and unreasonable customs and prejudices.

Second.—That the actual calendar time expended in "educating" the individual is unnecessarily long and may be easily shortened.

Third.—That the greatest waster of time is the so-called summer vacation period.

Fourth.—That the long summer vacation period arose from the pioneer necessity of the children helping with the work on the farm, and not to preserve their health or the health of the teachers.

Fifth.—That although material factories have changed in answer to quantity production calls, new conditions, etc., our educational factories have remained largely the same.

Sixth.—That the usual short summer session and abbreviated courses offered by them are of no real value to the vast majority of students.

Seventh.—That the quarterly system of voluntary continuous attendance at school is a desirable and economical plan that neither sacrifices efficient, effective and thoroughly acceptable instruction, nor curtails the actual clock hour time demanded for such instruction.

Eighth.—That there is no really logical or valid objection to applying a workable quarterly system to the curricula of colleges of pharmacy.

Any system which denies the individual the right and the opportunity to advance more rapidly and farther than his fellows inevitably leads to Bolshevism and socialism. Civilization will not be advanced by any system which represses above-average individuals so as to keep up the delusion of all men being equal. All men are born equal only in their right to equal privileges, and this right itself demands that these privileges be available to the individual just so soon as he is ready for them. Repression of the above-average individual does not assist his below-average brother.

Humanity as a whole should be lifted to the greatest heights possible; but if there be any individuals endowed beyond their fellows, these must be permitted and encouraged to rise as rapidly and as far as possible, for in so doing they will be the more capable of extending a helping hand to their brothers of lesser ability, and of raising the whole of humanity. The same opportunity is not democracy. Opportunity to be equal must be available. Ideal democracy must present equal

available opportunity for all, at any age, at any time, on all days of the week, and on all weeks of the year.

In order to be productive of good and goods a people must be healthy, industrious, intelligent and well-trained to do those things well which each individual chooses as his part of the world's activities. It is the function of the school to develop these qualities, but if all these things are secured for a people and still the time for production so limited that the individual leaves the world no richer than he found it, decay must positively follow. The histories of all republics relate this story. Industry, riches, literature, ease, extravagance, idleness, degeneration and decay complete the cycles of the history of humanity. To escape, or at least minimize, the decadence that inevitably follows the ease and extravagance begotten of wealth, it is essential that industry be maintained throughout the cycles of human existence.

The longer the time expended or the greater the number engaged in preparation for production without producing, the fewer the individuals left to produce. The fewer producers thus left can support fewer individuals preparing for production but not producing. If a fixed number of producers can sustain a certain number of non-producers for a long time, then the same number of producers can certainly maintain a much larger number of non-producers for a short time. What is true of a whole population is true of the unit of our civilization—the family.

The parents being a fixed number, the longer the children are kept from producing, the fewer of such children can the parents support. The intelligent portion of our population, those who are not willing to provide their children with less than what is usually considered necessary for a fair start in life, are, through non-marriage, late marriage and birth-control, so reducing reproduction that our population is more and more maintained by the so-called lower classes. Vital statistics foreshadow this impending condition. Records kept of the graduates of the larger universities and colleges show conclusively and accurately that that portion of our population, which has enjoyed the opportunities and privileges of higher training, is not reproducing itself in sufficient numbers to maintain the standard of mentality and efficiency that now exists in our land.

Education is not to be completed before production commences. Education is a life's job lasting from cradle to grave. However, there is no reason why production should not begin while learning how to produce better. One does not learn to walk by studying anatomy and physiology, or by shaking his foot indefinitely before taking a step. One learns to walk by walking. An individual learns to work by working, not by thinking about it. All the study in the world about work without production would permit a hungry world to starve to death. The first duty of every man is to support himself and his family. If he does not accomplish this, he is a failure.

Education is not information, but it is the ability to use information. The printing press rendered unnecessary the lumbering up of the human brain with a lot of information which might be preserved more permanently and accurately in a dollar book. Education is not found in books alone; in fact but a small portion is to be gained there. Real education enables the individual to do things better than he could do them without such training.

A very brief review of the origin and development of our graded school system will prove enlightening. The first industry of every nation was agriculture, and the summer or growing season was the busy time. The first school was and is the home. Later in the development of education, tutors were employed for the children of families or groups of families. Then the community school was inaugurated to function when the needs of agriculture could best spare the children, *i. e.*, during the winter months, and not during the summer or growing months. As riches accumulated and education became more and more in demand, the short winter school of several weeks gradually developed into longer and longer sessions until only the three or four months of the growing summer session were left for help at home. Thus grew the custom of summer vacations, not because of the necessity of rest for the student or the teacher, but from the necessities of an agricultural nation.

In democracies, where the ruled of to-day become the rulers of to-morrow, it soon became apparent that universal education must go hand in hand with universal suffrage, and a system of quantity production was demanded. The answer to this demand was the graded school system, just as the factory was the response to the demand for quantity production of materials. It is a question as to whether the quality was improved in either case.

The educational factory, the school, operated during the winter months, partly through agricultural necessities and partly through tradition and custom. During these periods of our country's development, while the material factories have answered every new call and new demand, made because of changing conditions, the educational factory or system has remained largely the same.

Our school systems are factories for quantity production of education at such cost as the taxpayer or individual can afford. It is the duty of the educators to improve the quality while economically keeping up the quantity. The system should be modified from time to time to make it responsive to the changing needs and the development of our civilization.

At the beginning, the graded school system consisted of eight years of elementary and four years of high school work, a total of twelve years. These twelve years were divided into twelve grades or classes, an educational step-ladder with twelve steps, each of which required one year to advance over. Students were divided into twelve groups according to their ability, and each group or class occupied one step on this ladder. Needless to say, there was just as much difference in the ability among the students of one class as there was between the most able member of one group and the dullest member of the class one step higher. However, this difference was ignored and the individual was sacrificed by a cast-iron system. All students in a given class had to advance at the same rate. If some could not keep up the work, they were moved to the class or step below—an entire year back—even though a much shorter review might have sufficed. If an individual was capable of doing more work than that prescribed, he was either held back to keep pace with the average, or was forced to skip an entire year's work and advance to the step or class above.

Later on this educational ladder was reconstructed so that there were twenty-four steps instead of twelve—each step one-half year long instead of one year—and promotions or advancements were semi-annual. This plan offered twenty-

four instead of twelve classes into which the entire student body might be divided. The evident injustice of the previous twelve-step plan was accordingly reduced one-half.

Recently the educational ladder has been remodeled in some localities so as to provide forty-eight steps instead of twenty-four, and each step is just one-fourth of the year in length instead of one-half. Further, the remodeled educational ladder is functioning the year round instead of but eight or nine months of the year. The increased number of classes in this system provides forty-eight classes or groups into which the student body may be better fitted, not perfectly fit to be sure, but evidently twice as nearly perfect as the twenty-four-step ladder, and four times as good as was possible with the twelve-step educational ladder.

Under the forty-eight step plan, a student not properly assigned can either advance or go back, as the case requires, one step or one-fourth of a year instead of one-half a year as with the semi-annual promotions, and instead of a whole year as with the annual promotion plan. Under this system the work done in nine months of the session continues to be done in the same nine months, but an additional three months' work is provided, so that one and one-third of the present nine months' school year's work is covered in one calendar year. The plan not only increases the rate of speed of the educational factory's machinery, but it also insures the continuous operation of the factory the year round. Who, but the proverbially impractical school teacher, would run his factory but three-quarters of the year, when the world is crying for its products and the raw material lie fallow one-quarter of every year?

Under this quarterly system a student, who is needed at home or forced to drop out because of limited finances and the necessity for working so as to accumulate more funds with which to attend school, can discontinue school work at the end of any three months of the year and take up the work where he left off at the beginning of one of the three months' period or quarters. Further, students endowed with mentalities and bodies capable of continuous or sustained efforts, who wish to attend all four terms or quarters of the calendar year, can do one and one-third year's work in one year's time; and, if they did this three calendar years, they would be four years advanced in their work. Thus, it would be possible for a student to gain during the entire course, one, two or three years, depending upon how much time his necessities or pleasures kept him out of school. One, two or three years saved at the beginning of life is just as valuable as the same number of years added to the end of life.

There is every argument that a school plant costing thousands or millions should not be idle three months of each year. Where there is a certain amount of work to be done, it very probably would cost less, rather than more, to do it regularly and continuously than spasmodically.

The quarterly system grants each individual his inherent right to advance as rapidly as his abilities permit, and not to be hampered and retarded by being bound to the stupid or the lazy. The system permits the capable and the strong to become productive one, two or three years sooner than under the old system.

The foregoing discussion has concerned itself largely with the quarterly system as applied to the elementary and the secondary schools where it would be possible to save a maximum of three years during the entire course of instruction. While

all the public school systems have adopted at least the twenty-four-step ladder plan with semi-annual advancements or promotions, and the others the forty-eight-step ladder or quarterly plan, most of the institutions of higher learning, the universities, the colleges and the professional schools, have tenaciously clung to the antiquated and time-wasting system of eight or nine months' sessions with their annual advancements or year-lost failures, and long wasteful summer vacations. To be sure there are and have been quite a few years summer sessions of more or less efficacy, but these short-period summer sessions were originally planned for and are more or less exclusively patronized by students who are attempting to make up deficiencies of various descriptions which have been acquired during the regular session in various fashions. The nature of these summer session courses and the type of the work by many students in at least some of the summer schools, have caused not a few instructors to refuse to accept short summer session courses "satisfactorily completed" in lieu of the work of the regular sessions.

A relatively small number of universities and colleges, such as the University of Chicago, have been operating under the quarterly system, but their results have been successful and confirm the belief that there is a real demand for educational opportunities at all times. Doubtless, better results are obtained because of the continuous occupation of the student. The continued use of the system is evidence that it has passed the experimental stage and has definitely demonstrated its worth and value. It has been shown that it is possible to shorten the time of preparation for productivity, not only without harm to the individual but with positive advantages to him and the world at large. It is the opinion of the writer that this system will ultimately be the American System of Education from the elementary school through the institutions of higher education.

Think of the actual time saved in educating an individual for such professions as medicine, dentistry and pharmacy if the quarterly system were applied from the elementary grades on through the professional school years! As pointed out above, a student could successfully complete the twelve years of elementary and high school training in nine years, thus saving three years. The minimum of two years of premedical training could be completed in one and one-half years, a saving of another half year, bringing the total thus far saved to three and one-half years. The four sessions of the medical course proper could be completed in three years, thus saving another year and bringing the grand total saving in years for the medical graduate to four and one-half years. Each year he would have had a total of one month's vacation, *viz.*, the two weeks usually provided in the quarterly system at Christmas, and two additional weeks before or at the end of the summer quarter. How many individuals, workers, in other walks of life enjoy more than a month of vacation annually? Furthermore, after a year or two of internship in a hospital, the medical graduate would be ready to enter upon the active practice of his profession in the full vigor, enthusiasm and confidence of well-prepared youth, instead of, as is too often true under the present system, at an age of waning enthusiasm and vigor. The dental graduate, with his one year of pre-dental work, would have saved a total of four and one-quarter years; and the pharmaceutical graduate of the three-year course would have saved a total of three and three-quarter years.

Thus, the quarterly system in the school of pharmacy proper would save the

student three-quarters of a year (three-year pharmacy course); in the dental school proper, one full calendar year; and in the medical school proper, one full calendar year.

In addition to the saving in time, there is also a monetary value to be considered. Dean E. W. Lord, of the College of Business Administration of Boston University, recently announced some interesting results of a survey among three groups of workers to determine the financial benefits of higher education.

Doctor Lord's study showed that the *untrained boy* goes to work at fourteen; reaches a maximum income of less than $1200.00 per year at the age of thirty; at fifty or earlier drops below his maximum income, because it is largely dependent on physical strength and manual dexterity; and in sixty out of every hundred cases becomes dependent upon others for support at the age of sixty. Between the ages of fourteen and sixty the untrained worker earns about $45,000.00. Not more than $2000.00 is earned in the four years that would have given him a high school education.

The *high school graduate* goes to work at the age of eighteen; catches up to his untrained brother within seven years (since he makes an average of $1200.00 per annum at the age of twenty-five); rises steadily to his own maximum of about $2200.00 to $2400.00 at forty; and continues at this level for the remainder of his life. The total earnings of the high school graduate between the ages of eighteen and sixty is about $78,000.00, a sum $33,000.00 more than that earned by the untrained man.

The permanent earnings of the *college or technical school graduate* rise practically without a break to $4000.00 at forty; $5000.00 at about forty-seven years of age; $5500.00 at fifty; and, since his income is dependent upon his mental ability and training, which is constantly improved by practice, it continues to rise until at sixty he is earning $6000.00 a year and often more. The total earning of the college graduate between the ages of twenty-two and sixty, not including anything earned during the college course, is $150,000.00, an excess of $72,000.00 over the earnings of the high school graduate, and $105,000.00 over the untrained worker. The totals for graduates of the professional schools and colleges would undoubtedly be still larger.

The foregoing figures are quoted at such length to show that the earning capacity of the trained individual is not determined by age, but rather by the thoroughness of his training and by his skill. Accordingly, if the school and college training are completed earlier, the producing period of the individual is lengthened and consequently the individual is enabled to earn a larger annual salary earlier in life, to increase his income sooner and to enjoy the fruits of his labor in greater measure more fully and for a longer period. The figures, in larger denominations than those above, are therefore undoubtedly applicable to the pharmacy school graduate.

Consideration of the foregoing facts leads the writer to the conclusion that the colleges of pharmacy of the United States should give serious and careful thought to the following:

1. The adoption of the quarterly system by the elementary and high schools.
2. The adoption of an all-year course of study of forty-eight weeks by colleges of pharmacy.

3. The division of the present conventional college session of nine months into three terms or quarters of twelve weeks each.

4. The institution of regular summer terms or quarters of twelve weeks duration.

5. The organization of classes each twelve weeks.

6. Three terms or quarters of twelve weeks each to constitute a college session.

7. Voluntary attendance at summer terms or quarters.

8. A study of such factors as health which should be used in deciding upon the admission of a student to all summer terms or quarters, and in permitting regular members of the teaching staff to continuously instruct during the summer periods.

FORTIFYING THE PRESCRIPTION COUNTER.*

BY CHARLES H. STOCKING.

Advancement along all lines in pharmacy to-day is no longer a matter for mere speculation. We hear less and talk less about the "good old days" in pharmacy, and, though we honor and revere the memory of those who laid the foundation, we believe we are building a superstructure that will stand the test of time. With our surveys and campaigns we are advertising pharmacy to pharmacists and are digging deep into the needs of the profession in order that corrective measures may be applied wherever necessary. Thus are we looking conditions squarely in the face and taking stock of present-day methods with the sole purpose of placing this time-honored profession where it can fulfill its mission in the public health group with impunity.

No pharmacy is a real pharmacy unless within its confines there exists a prescription department worthy of the name. Other departments such as those for the sale of toilet goods, soda water, cigars, etc., are frequently necessary and advisable, but the confidence of the public in any store is established unquestionably by the presence in the store of a well planned and well kept prescription department. In days gone by, this department was invariably located at the far end of the store in a dark and secluded spot beyond the view of even the most inquisitive customer. Here the pharmacist betook himself when he filled the prescriptions that were brought to his store. Here he manufactured the preparations that he used at the prescription counter.

Modern manufacturers of store fixtures have glorified the prescription and manufacturing room with sectional cabinets and polished table tops, leaving space for autoclaves and sterilizers, ointment mills and suppository machines, as well as for other important pieces of apparatus. But some of the fixture concerns have not yet realized the strictly commercial advantage to the pharmacist of the proper location of the prescription department, and, in line with older methods, still insist upon placing this most important department in the most obscure location in the store. As an instructor in a college of pharmacy I very frequently tell the students in my classes that they can have the kind of a store they want to have. In other words, if it is the desire of an individual to own and operate a

* Section on Practical Pharmacy and Dispensing, A. PH. A., Philadelphia meeting, 1926.

pharmacy catering to the best along pharmaceutical lines it is within his province to have that kind of a store. His every effort tempered with common sense will be directed to attain his ideal. One of the finest pharmacies I have ever visited was built in just this way about the ideals of the proprietor. The prescription department is not secluded, neither is it so arranged as to be of easy access by the customers. Extending along one entire side of the store and with a glass partition through which the waiting customer can see the process through which his prescription must pass when being filled, the prescription counter is the biggest asset the store possesses.

I contend that many stores now filling but a few prescriptions could increase the receipts from this source if their prescription departments were properly located, properly kept as to orderliness and cleanliness, and properly stocked with reliable drugs and chemicals. No insignificant addition to the fixtures in the prescription department is ample space for a liberal supply of reference books and current pharmaceutical journals. Every pharmacist owes it to himself and to his profession, as well as to his patrons, to devote considerable time to study in order that he may grow in knowledge and in skill. Too many pharmacists lack both the professional pride and the desire to keep abreast of the times. How they can hope to gain and hold the confidence of physicians without being informed regarding the results of recent advancements along the lines of pharmaceutical research, is more than one can tell. Without professional pride on the part of the pharmacist, there comes a lack of service to physician and to customer, and a gradual degradation into strict commercialism that in the end can have no other effect but to crowd out the vital element in pharmacy, the true service upon which pharmacy has thrived and prospered throughout the centuries.

Then, too, the pharmacist with the proper professional morale will manufacture such preparations as are feasible, including U. S. P., N. F. and special products. Raubenheimer has said, "To practice pharmacy is the pharmacist's birthright which he must not sell as it will end his existence." Others tell us that the pharmacist has not the time to devote to the manufacture of pharmaceutical products in his store. Many contend that all pharmaceuticals can be purchased more cheaply than they can be made. At a recent State pharmaceutical association I heard a prohibition commissioner urge the pharmacists of the State to reduce their alcohol withdrawals to the minimum in order to make it easier for the prohibition department to check up on the druggists of the State. He remarked that it was better to purchase *all* products as such a practice would save both time and money. He was not a pharmacist and so possessed none of the professional pride that belongs to the craft, and failed utterly to take into consideration the fact that many pharmacists prefer to make many of their own products. The practice of manufacturing adds to the pharmacist's skill, and builds up a prestige with the physicians in the community that cannot be estimated in terms of dollars and cents. The freshness of the products thus made is assured. The confidence the pharmacist has in products made in his own store is also a very important factor. True pharmacy to my mind has been created for pharmacy and not for any outside agency, governmental, or otherwise. True pharmacy will continue to be practiced among those pharmacists who are true to themselves, true to their physician friends, true to their customers and true to their profession.

The prescription counter is an asset that is often underestimated. It is the department around which centers professional pride. It is the heart of the true drug store, no matter how many other departments there may be within the walls. It is the department that keeps the pharmacist alive to his duties and which spurs him on to better things in pharmacy. Let all pharmacists guard this important division of the store and care for it with jealous zeal.

UNIVERSITY OF MICHIGAN,
COLLEGE OF PHARMACY.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

CONTENT OF PHYSIOLOGY COURSES GIVEN AT THE NEW JERSEY COLLEGE OF PHARMACY.

BY LLOYD K. RIGGS.*

The adoption at the New Jersey College of Pharmacy of the three-year course leading to the degree of Ph.G. makes available for instruction in physiology and related subjects at least two one-hour lecture periods each week during the entire course. The proper utilization of these—some two hundred hours—for instruction in biological sciences is the serious responsibility of those who have this work in charge and it is with the hope of provoking discussion and obtaining the views of my colleagues in this field that this paper is presented here to-day (Philadelphia meeting A. A. C. P.).

The great and continual increase in the number and importance of medicinal biological products is one of the great outstanding characteristics of the development of modern medical science and I believe that the statement that the scientific pharmacist should, in order to keep abreast of the times, have at least an elementary knowledge of this important line of medicinal products is a proposition which requires no supporting arguments.

It is now 130 years since Jenner, in 1796, gave definite proof that vaccination with the virus of cowpox gave complete protection against variola or small pox. It is, nevertheless, quite generally true that the study of immunity and immunizing agents is a rather new subject; so new in fact, that the last few months have been the introduction of several new products such as scarlet fever toxin and antitoxin, erysipelas antitoxin and measles antitoxin.

It was only twenty-five years ago that the constitution of epinephrine was demonstrated by Tackamine (1901). Since that time the pituitary body, the thyroid gland, the islet tissue of the pancreas, the parathyroid gland, lung and brain tissue and the ovaries have yielded medicinal products either of known chemical constitution (thyroxin) or which may be standardized by biological methods.

---

* Presented before the Section on Materia Medica of the American Association of Colleges of Pharmacy, September 1926.

Biological standardization of drugs, vitamine assay, etc., are now definitely a part of the Pharmacopœia and it is not improbable that future editions of this standard work will contain additional biological products and assays.

It is manifestly impossible that, in the time allotted to biological study in a three-year pharmacy course, students should be turned out as experts in the fields of physiology, biochemistry, immunology, endocrinology, nutrition and biological assay. Nevertheless, it appears that an attempt should be made to teach at least that portion of the fundamental aspects of these subjects which will enable the practicing pharmacist to comprehend and discuss intelligently with his clients of the medical profession the nature of the great mass of biological products and biologically standardized remedial agents which pass through his hands.

There appears to be no good reason why any pharmacy graduate of the present day should make so fundamental and elementary an error as to call either a concentrated antitoxin or a refined glandular extract a serum. Nevertheless such errors are all too common. It may also be remarked in passing that the physician to whom all biological products are "serums" is not, even to-day, an absolute novelty.

All this is, of course, quite an old and familiar story to all who are interested in the teaching of biological sciences. It has been presented here for the purpose of indicating in a very general way the trend of thought which we, at the New Jersey College of Pharmacy, have been following in an attempt to set up for ourselves a goal we hope to achieve in the course of instruction, which we comprehend under the broad general term Physiology.

We tentatively propose that the freshman year of physiology teaching be devoted to what is ordinarily called "Elementary Physiology," introducing only such considerations of anatomy as are essential to the understanding of the functions of organs, tissues and cells. We propose to devote the second year very largely to chemical physiology or biochemistry. We hope in these two years to build up such a background that the third year may be given over to a study of what might be called, so far as the science of pharmacy is concerned, the practical applications of the work of the first two years. In the senior year we propose to pursue an elementary study of immunology, a foundation for which will have been laid in the first two years of physiology and in the course in bacteriology. The physiologic action of drugs and the biological assay of official drugs will then be considered and the vitamine assay (U. S. P. for vitamine A) will be introduced. Finally we propose to study the medicinal products obtained from the ductless glands and other animal tissues. It is hoped that we will be able to give demonstrations of the assay of all of these glandular products.

It is, of course, impossible in the time available to discuss our outline of topics in any detail, but we may give one or two illustrations. Let us take for example, the teaching of the blood. We propose in the first year to treat the blood as a tissue; to first discuss the composition of blood as a whole and then take up in more detail the plasma and the form elements.

Our outline for the white blood corpuscles includes the elements of the anatomy of the various types of leucocytes, *i. e.*, their form, size, structure, staining reactions and number. We plan, however, to omit the differential leucocyte count. We make a special topic of amœboid movement and thus introduce the ideas of

phagocytosis and of wandering cells. In connection with a study of the blood-forming organs the origin of the polymorphonuclear leucocytes and of the lymphocytes is pointed out in an elementary way. Finally the relation of leucocytes to pathological conditions, such as general infections and inflammatory processes, is touched upon.

Our outline on the red blood corpuscles calls for the presentation of their number, size, structure, etc., and points out their lack of nuclei and the probable relationship between this fact and their partially lost power of respiration and their totally lost power of growth, or synthetic metabolic activities. The chemistry of hemoglobin is treated in a very elementary manner and the oxidation and reduction of hemoglobin is demonstrated.

Blood platelets are merely mentioned in the first year and a discussion of these bodies is postponed until a later time.

The composition of plasma is treated in quite an elementary way. Its salts and proteins are discussed, but a discussion of its content of sugar, amino acids, urea and uric acid, etc., is postponed until a later time.

Special emphasis is placed upon the intimate relationship existing between blood, lymph and the cells of the various tissues.

In the second year the composition of plasma is considered in considerably greater detail. The separation of the several blood proteins is demonstrated and their properties studied. Preliminary announcement is made of the close relationship existing between globulin and antibodies.

The coagulation of the blood is studied in some detail, but controversial theoretical considerations are very largely avoided.

The chemistry of hemoglobin is further studied and the idea of the relation of oxygen tension in the lungs and in the tissues as the determining factor in the oxidation and reduction of hemoglobin is introduced and used as a basis for a discussion of oxygen transportation and cell respiration.

Blood is considered as a carrier of absorbed food products and also as a carrier or the waste products of cell metabolism. The subjects of digestion, absorption, metabolism and excretion are thus related through a study of the blood.

Finally the blood is considered a physicochemical system by which the acid base balance of the body is indicated. In this connection we expect to introduce the conception of salt and protein buffer solutions.

Our outline for the study of blood in the third year calls for a brief study of various hemolyzing or laking agents (physical and chemical agents, unknown constituents of blood serum, bacterial products, vegetable poisons and snake venoms).

An elementary study of immunity is undertaken. Natural, active and passive immunity are discussed in some detail. The relationship between infection and active immunity, also the artificial production of active immunity by the use of vaccine viruses, toxins, bacterial vaccines, toxin antitoxin mixtures and proteins (allergens) is given in considerable detail.

The preparation and characteristics of immune sera and antitoxins are described and related to the chemistry of the blood proteins discussed in the second year.

The preparation and characteristics of cowpox virus and of the attenuated virus of rabies employed in the Pasteur Antirabic treatment is discussed and some-

thing of the history of the discovery and development of these two important procedures is introduced.

The idea of the primary toxicity of several proteins (toxicity of human serum for guinea-pigs) is introduced and very carefully distinguished from the toxicity of proteins to animals previously sensitized by small injections of the same protein (anaphylaxis). Upon the foundation thus laid a discussion of desensitization by means of specific food and pollen proteins (allergens) is presented. The diagnostic tests for protein sensitivity are also considered.

The preparation and action of bacterial vaccines, autogenous and stock vaccines, are discussed in some detail.

The coagulation of the blood is again studied and the action of various tissue extracts marketed for the purpose of hastening the coagulation of blood are discussed and their action demonstrated.

The phagocytic action of the white blood corpuscles is reviewed and the idea of opsonins is introduced and discussed in a rather elementary way.

Perhaps more space than is necessary has been given to a discussion to our outline on the blood but this has been done because of the relative complexity of the subject and the considerable importance of the topics introduced.

The ductless glands are similarly treated in our outline. For example, in the first year, the elementary anatomy and physiology of the thyroid gland are discussed with special reference to hypothyroidism, pathological as well as experimental, also hyperthyroidism both experimental and pathological are discussed. In the second year the relation of the thryoid gland to basal metabolism is discussed and an elementary review of Kendall's work on thyroxin is presented. In the third year various medicinal products of the thyroid gland are discussed as is also the Hunt Acetonitril Method of assay of thyroid preparations.

These illustrations are, I believe, sufficient to indicate our method of attack. The topics which we introduce in the first year are as follows:

1. The cell
2. Tissues
3. Muscle physiology
4. Blood
5. Circulation
6. Respiration
7. Food materials
8. Digestion
9. Absorption
10. Metabolism
11. Excretion
12. Nervous system
13. Special senses
14. Ductless glands
15. Reproduction

Our topics for the second year are as follows:

1. Carbohydrates
2. Fats
3. Proteins
4. Enzymes
5. Salivary digestion
6. Gastric digestion
7. Digestion in the intestine
8. Metabolism
9. Excretion (Urine)
10. Feces
11. Nutrition (including vitamines)
12. Chemistry of blood
13. Ductless glands
14. Brain and nervous tissue
15. Chemistry of several tissues

Our topics for the third year are as follows:

1. Principles of immunity and their application to a study of immunizing agents.
2. Medicinal biological products obtained from ductless glands and from other tissues.
3. The physiologic action of drugs and their biologic assay.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the Consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

BALTIMORE.

At the meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION at the Emerson Hotel on April 29, 1927, a motion picture, "How Biologicals Are Made," was shown by Mr. Charles Stevens of the Department of Experimental Medicine, of Parke, Davis & Co.

The picture was in two reels—a total of 2000 feet, and portrayed the story in consecutive fashion. Diphtheria Antitoxin was used to illustrate the manufacture of Antitoxins and Serums and the scenes showed the collection of bacteria from a patient having Diphtheria, plating to obtain a pure culture, the planting of the bouillon with this pure culture, filtration of the bouillon after the diphtheria bacilli have been grown in it to obtain the toxin, determining strength of toxin by testing on the guinea-pigs, inoculation of toxin into the horse, bleeding of the animal, the collection of the serum, the use of the guinea-pigs for the testing of the serum for its antitoxic power, and concentration of the serum and testing for purity and potency.

Typhoid Vaccine was used to illustrate the manufacture of all Vaccines and the scenes shown gave a very clear picture of the method of preparing Bacterial Vaccines. Small Pox Vaccine showed the inspection of heifers by veterinarians, the testing of heifers with tuberculin, the preparation of the animal for inoculation, the inoculation process, the propagation period and removal of the vaccine pulp.

Other interesting scenes were the growing of Cannabis and Digitalis at Parkedale, the standardization of serums, bacterial vaccines and vaccine virus, the injection of antimeningococcic serum directly into the spinal canal of a patient and an old photograph injecting the first horse with diphtheria toxin in 1894.

Before the film was shown there was a short introductory talk, explaining briefly and concisely the difference between antitoxins and serums and what bacterial vaccines are.

Continuing the excellent musical programs which were instituted some time ago, the soloist was Miss Helen Rouse, who pleasingly entertained the members and guests with several well chosen vocal selections.

Vice-President Frank L. Black presided at the meeting.

B. OLIVE COLE, *Secretary-Treasurer.*

CHICAGO.

The 166th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Friday evening, April 8, 1927, at the University of Illinois School of Pharmacy, President Gathercoal presiding.

The first speaker of the evening was Mr. P. J. Kolb, who presented an interesting talk on the "History of Mechanical Refrigeration." He traced the development from the first records of the use of snow and ice to artificial ice and mechanical refrigeration of to-day. In the ancient times snow was first used to cool the wines, the snow being stored in great

trenches. The ancient Egyptians knew the secret of cooling by evaporation, filling porous vessels with water and exposing to the night winds. Frozen ices and desserts first became popular during the time of Richard the Lion Hearted.

The first record of ice delivery in America dates back to 1805 when it was sent to Martinique to stay the ravages of yellow fever.

He told of the discovery of producing cold by the evaporation of liquefied ammonia by Faraday. The first ice machine was invented in 1775. In 1875 the first ammonia compression machine was introduced in the United States by Dr. Linde. Many gases have been used to produce a lowering of temperature, among which are ammonia, sulphur dioxide, methyl chloride and carbon dioxide. Carbon dioxide was not suitable because of the high pressure necessary to liquefy the gas. Methyl chloride has not proved to be satisfactory because of its great diffusibility. Ammonia is now used in most of the larger refrigeration plants to cool the brine solution and is easily compressed but is not the ideal gas for small refrigeration plants as it loses its strength through contact with the lubricants. Sulphur dioxide appears to be the best gas for use in the smaller refrigeration systems. It is easily compressed and, because of its affinity for oil, aids lubrication. Difficulties were first encountered because the gases were not dry but this has been overcome by completely drying the gas and the machine itself.

Mr. Hyde of the Frigidaire Company gave a demonstration of the mechanical refrigeration and explained in detail the principles and way in which cooling effect is obtained and the temperature regulated. The gas is compressed in a chamber, passes through cooling coils, is then expanded or vaporized in vacuum, passing through coils when it absorbs the heat and is then compressed again by the machine. The practical use for mechanical refrigeration was emphasized. It is being used in iceless soda fountains and refrigerators where several different temperatures may be maintained by the same cooling machine. It can thus be regulated for syrups, ice cream, biologicals, etc., which require different temperatures. The cost of upkeep is less than for ice.

Mr. Munson of the Bishop-Babcock Company presented the use of mechanical refrigeration in soda fountains. They are more economical to operate although the initial cost is higher. Shrinkage in ice cream which is usually about 25% of the total may be reduced one half because the ice cream may be kept hard at all times and in perfect condition.

Mr. Kramer of the Guaranty Soda Fountain Company spoke on the value of the fountain to the present day pharmacist. According to statistics the soda fountain contributes 14% of the total sales in drug stores.

A general discussion followed and a rising vote of thanks was tendered the speakers of the evening.

S. W. MORRISON, *Secretary.*

DETROIT.

The April meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held April 12th in the headquarters of the Wayne County Medical Society. Dinner was served prior to the meeting. President Rowe presided; the minutes of the previous meeting were read and approved. Mr. Seltzer, Chairman of the Committee on Nominations, reported the following nominees:

President, A. A. Wheeler.
First Vice-President, R. H. Blair.
Second Vice-President, Justin L. Rodgers.
Secretary, Bernard A. Bialk.
Chairman, Program Committee, R. T. Lakey.
Treasurer, F. F. Ingram, Jr.

E. K. Field moved the report of the committee be accepted, seconded by William A. Hall—Carried.

President Rowe then introduced the speakers of the evening, Messrs. A. E. Moyer and Walter E. Meyer. They represented the clerks on the Program, this being Clerks' Night. Mr. Moyer, the first speaker, gave a most interesting and complete paper on "Treatise on Narcotic Records." His paper emphasized the necessity of making accurate reports of narcotics to comply with the Harrison Law. Mr. Moyer told how these reports and records were handled at the store where he is responsible for the narcotics.

Mr. Meyer followed with an excellent paper entitled "The Drug Clerk's Problems and Answers." He said the Prescription Department is the backbone of the drug store and not the numerous side-lines as is the general thought, for there it is that a real public service is rendered. He stressed the responsibilities and duties of the drug clerks who would be the proprietors of to-morrow and owe their employers the best efforts possible

in maintaining and upholding the reputation established by the stores where they are employed.

A general discussion followed. Mr. Field told of a scheme employed by them in marking the price of prescriptions on the label, enabling the clerk to tell the customer the price on refills without any trouble. Mr. Hall answered a question raised by Mr. Meyer in regard to the proper reply to a patient's inquiry as to the benefits of a prescription. He said the further we keep away from commenting on the prescription the better. Mr. Seltzer, however, said it was not wise to give the impression that the information was being withheld nor that we did not know. He also expressed his appreciation of both papers; he said they were wonderfully beneficial to both the proprietor and the clerk.

Dr. Dykema, manager of the Mutual Drug Co. of Detroit, cited several examples of narcotic difficulties, proving the necessity of the Government's requirement that a strict record of all narcotics must be made.

Mr. Lakey commented on the Clerks' program which he said was a good beginning. He said the clerk of to-day is undersold on Pharmacy and oversold on the commercial side of the drug store. He encouraged the clerks to become members of the AMERICAN PHARMACEUTICAL ASSOCIATION where the clerks' proprietors and the clerks are on the same level and can exchange ideas. This paved the way for a very lively discussion led by Dr. Dykema who was so well pleased with the Clerks' program that he offered to donate $25.00 towards a fund to stimulate interest in the ranks of the clerks and students for writing papers and appearing before the Detroit Branch.

Mr. Seltzer said the proposition was too good to be passed by lightly and he further suggested that memberships also be considered as prizes for writers of papers. President Rowe told of his experience in a similar program that brought splendid results. He thanked the speakers for the excellent papers and the enthusiasm aroused by them. He said he hoped this was only the beginning of these programs offered by the clerks.

Chairman Seltzer reported the following additions to the nominations:

Council of Clerks, Olivia Williams and William F. Smith; Council of students, Detroit College of Pharmacy, Charles Robertson and Clifford Anderson.

Detroit City College and the University of Michigan representatives were not ready to report at this time.

E. K. Field moved the additions to the nominations be accepted, seconded by William A. Hall, and carried by vote.

BERNARD A. BIALK, *Secretary.*

PHILADELPHIA.

The April meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday evening, April 12th, at the P. A. R. D. Building, 2017 Spring Garden St., President Hendrickson presiding.

A large number of those present had attended the regular dinner at the Touraine early in the evening and the meeting itself was called to order at 8:30 o'clock.

Upon a motion from the floor the reading of the March minutes was dispensed with.

The Secretary read several communications and announced the appointment by the President of the following committees to serve for the ensuing year:

Practical Pharmacy: William L. Cliffe, Chairman; John J. Kelley and J. W. England.

Professional Relations: Dr. H. C. Wood, Jr., Chairman, W. W. McNeary and Ivor Griffith.

Membership: Leo G. Penn, Chairman, Otto Kraus, B. C. Goodhart, William J. Stoneback, C. Louis Seip, C. C. Pines and Harry D. Silver.

Entertainment: J. W. E. Harrisson, Chairman, Elmer Michener and Ralph R. Foran.

The tentative program as made out for the year was also read and special attention was called to the May meeting at which time Mr. Robert L. Hobart, of the Merchandising Department of the Wharton School, will be the speaker. This being the last meeting of the year it will be devoted to an effort to give the retailers some special merchandising notes and pointers to help them carry over the dull summer months.

Chairman Penn of the Membership committee presented applications for membership for Benjamin Cantor and Placido Venuto. These men were accepted by the Branch pending the action of the parent Association.

Mention was again made of the voting which is under way for the A. PH. A. headquarters building and members were urged to follow the original resolution of the Branch in casting their votes for Washington, D. C.

A feature of the evening's program was a

skit entitled "A Typical Day in a Prescription Store." This was presented by Mr. Charles T. Pickett and a small cast including B. C. Goodhart, C. Louis Seip, Ambrose Hunsberger, Howard J. Siegfried and A. G. Keller. This was one of the most interesting and valuable programs that the branch has had for many a day. The story was staged in a prescription store with Mr. Pickett acting as proprietor. He first placed his audience in a receptive mood and then opened the store for business, looking over the morning mail with its usual amount of advertising circulars, bills and a few refill prescriptions. Then the customers came in one by one and as each event took place some special feature of dispensing or manipulation was involved which proved to be very unique. For instance the mail order brought in a prescription refill which proved to contain a narcotic. Prescriptions came in for high-priced items and combinations difficult to compound, also several with excessive doses. Then the doctor also made his appearance requesting a narcotic solution for office use and pure alcohol, etc.

At the close of their part of the program Mr. Pickett and his cast were given hearty applause and a rising vote of thanks and everyone said that it was a very enjoyable and valuable program.

Considerable discussion followed and the subject was so interesting that it was with difficulty that the meeting broke up after 11 o'clock.

ADLEY B. NICHOLS, *Secretary.*

"SHALL CONGRESS HAVE POWER OF LIFE AND DEATH OVER THE SICK?"

In an article the above question is discussed and reported on by a committee, in the *Journal A. M. A.* for April 30th. The introductory paragraphs are reprinted. The report of the committee is signed by Drs. Samuel W. Lambert, James F. McKernon, T. C. Chalmers, Charles L. Dana, Frederic E. Sondern, J. Bentley Squier, Harlow Brooks, N. B. Van Etten, Warren Coleman.

"The Supreme Court has decided by a majority of 5 to 4, in the case of Lambert *vs.* Yellowley, that Congress has power to limit the amount of whisky which a physician may prescribe for a patient to one pint in ten days, irrespective of the patient's condition or the physician's opinion as to the patient's needs.

"Previously the Supreme Court had decided by unanimous opinion, in the case of Everard's Breweries *vs.* Day, that Congress has power to declare that malt liquors are without therapeutic value and may not be used as remedial agents by physicians.

"Under these decisions Congress becomes both pharmacologist and physician; Congress has power to decide what is and what is not medicine; Congress may fix by legislative fiat the dosage of remedies contained in the United States Pharmacopœia. And under these decisions, Congress may penalize any physician who dares to oppose his trained judgment to the fiat of Congress, by forbidding him to use whisky and wines in his practice for a year, and by fine or imprisonment or both.

"Not even the Middle Ages may boast of a greater triumph of legislative imperialism over the methods and achievements of science."

The closing paragraphs read:

"Once the people realize that Congress, in the Volstead Act, has arrogated to itself the functions of the physician, the question

"Shall Congress Have Power of Life and Death Over the Sick? will be answered at the polls instead of in the courts."

Dr. Hugh S. Cumming, surgeon-general United States Public Health Service will be the commencement speaker at the Medical College of Virginia at Richmond on Tuesday, May 31st. Doctor Cumming is an alumnus in medicine both of the University of Virginia and the Medical College of Virginia.

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1926–1927.

Office of the Secretary, 10 West Chase St., Baltimore, Md.

LETTER NO. 9.

April 30, 1927.

To the Members of the Council:

88. Local Secretary for 1926–1927. Motion No. 28 (See Council Letter No. 8, page 366) has been carried and A. W. Pauley of St. Louis, Mo., has been elected as Local Secretary.

89. Application to Use the Text of the N. F. V. Motion No. 29 (See Council Letter No. 8, page 366) has been carried and Hugh C. Muldoon and Adrian T. Ward have been so advised.

90. Budget Appropriation for the Drug Trade Bureau of Public Information. Motion No. 30 (See Council Letter No. 8, page 366) has been carried and this appropriation has been increased to $400.00.

91. Election of Members. Motion No. 31 (See Council Letter No. 8, page 51) and *Motion No. 32* (See Council Letter No. 8, page 367) have been carried. Applicants for membership numbered 108 to 135 inclusive and applicants for membership numbered H-274 to H-364 are therefore declared elected.

92. Honorarium to the Chairman of the Committee on National Formulary. The following communication has been received:

"To the Council,

AMERICAN PHARMACEUTICAL ASSN.

The undersigned members of the Committee on Revision of the National Formulary, believing that an appropriate honorarium should be awarded to Wilbur L. Scoville for his devoted and self-sacrificing work as chairman of the N. F. Committee and understanding that Chairman Scoville is loath to accept an honorarium, unless honoraria are also provided for the other 14 members of the Committee, respectfully present to the A. PH. A. Council their views on the situation as follows:

1. We have counted it an honor to serve under Chairman Scoville and we were only too glad to do our small part under his leadership. We therefore positively decline to accept any honoraria for the advisory work which we had the honor of performing.

2. On the other hand, Chairman Scoville's work in connection with N. F. revision was so enormous that its value to the A. PH. A. cannot be measured in dollars and cents. However, in the past revisions, the chairman of the N. F. Committee has been given and has accepted an honorarium and such recognition of Chairman Scoville's work should be given by the A. PH. A. Council and should be accepted by Chairman Scoville.

3. We therefore suggest to the A. PH. A. Council that it appropriate the sum of $1000 out of the N. F. Fund as an honorarium to Chairman Scoville, and as a slight token of the Association's appreciation of the great work performed by Chairman Scoville in bringing the recent revision of the National Formulary to a successful conclusion.

(Signed by)*

H. V. ARNY
G. M. BERINGER
H. A. B. DUNNING
BERNARD FANTUS
O. A. FARWELL
S. L. HILTON
E. L. NEWCOMB
OTTO RAUBENHEIMER
L. A. SELTZER
C. M. SNOW
P. HENRY UTECH
C. H. LAWALL."

(*Motion No. 33.*) *It is moved by Hilton that the sum of $1000 as an Honorarium be paid to W. L. Scoville as a token of the appreciation of the American Pharmaceutical Association for his splendid services as Chairman of the Committee on the National Formulary in bringing the Fifth Revision of the National Formulary to a successful conclusion.* A vote on this motion will be called for in three weeks.

93. Sales of the N. F. V. Series B of the

* Prof. E. Fullerton Cook is in Europe and Dr. H. Engelhardt died Feb. 9, 1927.

N. F. V, consisting of 10,000 copies buckram bound, has been completed and part of them delivered to the distributors. With the quarter ending February 28, 1927, practically all of Series A, consisting of 20,000 copies, had been sold.

94. Award of the Contract for Printing and Mailing Volume 14 of the Year Book, covering the Year 1925. The following communication has been received from Chairman DuMez of the Committee on Publications:

> "Invitations to submit bids on Volume 14 of the YEAR BOOK were sent out some time ago and several bids were received. It is the recommendation of the Committee on Publications that the contract for the printing and mailing of Volume 14 of the YEAR BOOK be awarded to the Lancaster Press of Lancaster, Pa. This firm printed Volume 13 and their work was satisfactory. The bid for Volume 14 is practically the same as for Volume 13. After the contract is awarded, an enquiry will be sent to each member to learn those who desire a copy and only a sufficient number of copies to meet the demand will be ordered. Based on the experience with Volume 13, the total cost for Volume 14 will be much less."

(*Motion No. 34.*) *It is moved by DuMez that the Contract for Printing and Mailing Volume 14 of the Year Book be awarded to the Lancaster Press of Lancaster, Pa.*

A vote on this motion is called for at this time but will be considered as tentative if any member wishes to submit comments or desires additional information.

95. Trademarking the Journal. A certificate of registration of a trade mark for the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION has been received from the Commissioner of Patents. This certificate remains in force for twenty years from the second day of December 1926, unless sooner terminated by law. (See Council Letter No. 12, 1925–1926, page 504.)

96. Applications for Membership. The applications properly endorsed and accompanied by the first year's dues have been received:

No. 136, Herman L. Berger, 115 Palisade Ave., Jersey City, N. J.; No. 137, William Britt, Britt's Pharmacy, Juneau, Alaska; No. 138, John Cameron, Peking Union Medical College, Peking, China; No. 139, Benjamin Cantor, 19th & Christian Sts., Philadelphia, Pa.; No. 140, C. M. Clark, c/o Strong Cobb & Co., Cleveland, Ohio; No. 141, W. H. Edelman, Sheridan, Wyo.; No. 142, Albert E. Ely, Glasgow, Ky.; No. 143, William Bradford Hayes, 2566 W. Fairmount Ave., Baltimore, Md.; No. 144, Edwin M. Holt, 116 R. St., N. E., Washington, D. C.; No. 145, Walter C. Jones, Birmingham Southern College, Birmingham, Ala.; No. 146, Ralph Kitzmiller, Anchorage, Alaska; No. 147, Andrew P. Martin, Congress & Church Sts., Tucson, Ariz.; No. 148, Herbert R. Mayes, 119 West 40th St., New York, N. Y.; No. 149, John Bernard Murphy, 301 Pacific Ave., New Orleans, La.; No. 150, I. M. Ostrum, Cor. 10th and Jefferson Sts., Philadelphia, Pa.; No. 151, C. R. Ott, U. S. Marine Hospital, Stapleton, S. I., N. Y.; No. 152, Frederick Richard Rogers, Box 13, Dayton, Tenn.; No. 153, Robert Rowen, 864 No. Beachwood St., Philadelphia, Pa.; No. 154, Herbert Inman Rudduck, 722 E. Third St., Mishawaka, Ind.; No. 155, Mabelle M. Sawyers, 20 N. Ashland, Ave., Chicago, Ill.; No. 156, Ernest C. Schmidt, 450 Main St., New Rochelle, N. Y.; No. 157, W. L. Seibert, 468 Dewitt St., Buffalo, N. Y.; No. 158, Sister Catherine Gardner, 1401 Division St., Baltimore, Md.; No. 159, William Oscar Smith, 1712 Wisconsin Ave., N. W., Washington, D. C.; No. 160, Lawrence J. Taylor, P. O. Box 816, Eustis, Fla.; No. 161, Placido Venuto, 801 South 7th St., Philadelphia, Pa.; No. 162, Adrian Turner Ward, North Conway, N. H.; No. 163, Harry Jones Wiest, 24 North Sherman St., York, Pa.; No. 164, Oliver Jacob Weinkauff, 429 Linn St., Peoria, Ill.

(*Motion No. 35.*) Vote on applications for active membership in the AMERICAN PHARMACEUTICAL ASSOCIATION.

97. Applicants for Membership on Account of Contributions to the Headquarters Building Fund. The following non-members of the A. PH. A. have pledged $25.00 or more to the Headquarters Building Fund and have made a cash payment of $5.00 or more. They are entitled to membership and you are requested to vote on the applications which have been properly endorsed.

H-365, Dorothy L. Bickel, Albany, Mo.; H-366, Kenneth Cross, 524 Baker St., Albany, Ore.; H-367, Marvin Wightman Davis II, Marion, S. C.; H-368, Harold C. Epley, 1017 W. 35th St., Los Angeles, Calif.; H-369, Anna Pauline Flynn, 116 E. 20th St., South Port-

land, Ore.; H-370, George W. Gingell, 1504 Sheridan St., Detroit, Mich.; H-371, Leo Daniel Goetz, R. R. No. 6, Brookville, Ohio; H-372, John O. Haman, Box 2465, Stanford University, Calif.; H-373, Harry W. Harris, 500 N. Hamlin Ave., Chicago, Ill.; H-374, Walter A. Harris, 500 N. Hamlin Ave., Chicago, Ill.; H-375, William Stuart Hender, 815 W. 37th St., Los Angeles, Calif.; H-376, Aina Luzelle Johnson, 429—10th Ave. East Duluth, Minn.; H-377, Eric Philip Johnson, 211 E. 33rd St., New York, N. Y.; H-378, Orel Jones, Oconto, Nebr.; H-379, Kenneth Kerwood Kull, 110 N. 38th St., Omaha, Nebr ; H-380, Ralph Wendell Lewis, 522 S. Dodge St., Iowa City, Iowa; H-381, Herbert Mall, 511 So. 4th St., Atchison, Kan.; H-382, Wilma Katherine Maus, 132 E. Graham Ave., Council Bluffs, Iowa; H-383, William Herbert McCroskey, West State St., Lawrenceville, Ill.; H-384, Warren M. McGrath, 515 Central Ave., Superior, Nebr.; H-385, Cleopas John Messer, 923 N. 4th Ave., Yakima, Wash.; H-386, Fred F. Montgomery, 2529 Third Ave., Huntington, W. Va.; H-387, Fred William Nehring, 2120 E. Prairie Ave., St. Louis, Mo.; H-388, John Joseph Neilan, 201 Main St., Milford, Mass.; H-389, Marie S. Pole, 27 Jefferson St., Lexington, Va.; H-390, John Harmon Robinson, Frankston, Texas; H-391, Truman W. Robnett, Halsey, Oregon; H-392, Howard Irwin Scaggs, 1601 Light St., Baltimore, Md.; H-393, Edward Waters Whiteside, 1921 Pennsylvania Ave., Washington, D. C.; H-394, Eugene Henry Wiggenhorn, c/o Martin Drug Co., No. 2, Tucson, Ariz.

(*Motion No. 36.*) Vote on applications of contributors to the Headquarters Building Fund for Membership in the AMERICAN PHARMACEUTICAL ASSOCIATION.

98. Applicants for Life Membership on Account of Contributions to the Headquarters Building Fund. Under a provision made by the Board of Directors of the A. PH. A. at a meeting held in Washington, D. C., on December 7, 1923, a contributor to the Headquarters Building Fund who subscribed $1000.00 or more is entitled to life membership. The following application, which has been properly endorsed, is submitted under this provision.

No. L. M. 2. A. Homer Smith, 307 West Pratt St., Baltimore, Md.

(*Motion No. 37.*) Vote on application for Life Membership in the AMERICAN PHARMACEUTICAL ASSOCIATION.

99. Time of and Headquarters for the Next Annual Meeting. Local Secretary A. W. Pauley writes that the Local Committee of Arrangements, after a careful survey of conditions, recommends to the Council that the week of August 22–27, 1927, be the time and the Coronado Hotel the Headquarters for the next annual meeting. The Committee desires to have these suggested dates selected as this is the last week of the annual program of the Municipal Open-Air Opera and they plan to arrange an attendance on a performance of the opera as one of the entertainment features.

(*Motion No. 38.*) *It is moved by Kelly that the week of August 22–27, 1927, be selected as the time and the Coronado Hotel of St. Louis, Mo., as the Headquarters for the annual meeting of the A. Ph. A. for 1926–27.* Mr. Pauley asks that the decision of the Council be given as promptly as possible so that the arrangements for the meeting may be completed. A vote is therefore called for at this time but will be considered as tentative if any members object or desire additional information.

E. F. KELLY, *Secretary.*

DONATIONS TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Hynson, Westcott & Dunning have donated 92 volumes to the AMERICAN PHARMACEUTICAL ASSOCIATION. Most of them are text and reference books on pharmacy, chemistry, etc.; none of them are recent editions. Among them are 21 volumes of the *American Journal of Pharmacy*, a General Index (up to 1873) and Decennial Index (1891). The oldest volume is "Coxe's Medical Dictionary," 1817.

The JOURNAL expresses thanks to the donors on behalf of the A. PH. A.

THE FLOODS IN THE MISSISSIPPI VALLEY.

It is hoped that much sickness will not follow the devastation and destruction brought about by the floods. The sufferers have the sympathy of the country, but this amounts to little more than giving assurance that they are not forgotten. The Red Cross has been doing great work; the Government has given every assistance possible and is now directing efforts to prevent outbreaks of disease and sickness in the recently inundated areas.

A HALF CENTURY OF THE NATIONAL FORMULARY, 1880-1930.

BY H. A. LANGENHAN.

(*Continued from p. 376, April* JOUR. A. PH. A.)

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.†											
	20	30	30*	40	50	60	70	80	90	00	10	20
DEXTRINUM ALBUM	..	..	..	..	..	..	..	..	..	..	L	L
White Dextrin	..	..	..	..	..	..	..	..	..	..	E	E
Dext. Alb.	..	..	..	..	..	..	..	..	..	..	A	A
DIOSCOREA	..	..	..	..	..	..	..	..	..	..	L	L
Dioscorea	..	..	..	..	..	..	..	..	..	..	E	E
Wild Yam Root	..	..	..	..	..	..	..	..	..	..	S	S
Diosc.	..	..	..	..	..	..	..	..	..	..	A	..
Dioscor.	..	..	..	..	..	..	..	..	..	..	..	A
DROSERA	..	..	..	..	..	..	..	..	..	..	L	L
Drosera	..	..	..	..	..	..	..	..	..	..	E	E
Sundew	..	..	..	..	..	..	..	..	..	..	S	S
Droser.	..	..	..	..	..	..	..	..	..	..	A	A
DULCAMARA	45	45	45	45	45	45	45	45	45	..	L	L
Dulcamera	..	..	..	..	..	..	..	..	..	..	..	E
Bittersweet	..	..	..	..	..	..	..	..	..	..	..	S
Bittersweet	..	..	..	..	..	..	..	..	..	..	E	..
Dulcam.	..	..	..	..	..	..	..	..	..	..	A	A
ECHINACEA	..	..	..	..	..	..	..	..	..	..	L	L
Echinacea	..	..	..	..	..	..	..	..	..	..	E	E
Echin.	..	..	..	..	..	..	..	..	..	..	A	A
EUCALYPTI GUMMI	..	..	..	..	..	..	..	..	..	..	..	L
Eucalyptus Gum	..	..	..	..	..	..	..	..	..	..	..	E
Red. Gum	..	..	..	..	..	..	..	..	..	..	..	S
Eucalypt. Gum.	..	..	..	..	..	..	..	..	..	..	..	A
EUONYMUS	..	..	..	..	..	46	46	46	46	46	L	L
Euonymus	..	..	..	..	..	..	..	..	..	..	E	E
Wahoo Bark	..	..	..	..	..	..	..	..	..	..	S	S
Euonym.	..	..	..	..	..	..	..	..	..	..	A	A
EUPATORIUM	47	47	47	47	47	47	47	47	47	47	L	L
Eupatorium	..	..	..	..	..	..	..	..	..	..	E	E
Thoroughwort	..	..	..	..	..	..	..	..	..	..	S	S
Bonset	..	..	..	..	..	..	..	..	..	..	S	S
Eupator.	..	..	..	..	..	..	..	..	..	..	A	A
EUPHORBIA	..	..	..	..	..	..	..	..	..	..	..	L
Euphorbia	..	..	..	..	..	..	..	..	..	..	..	E
EUPHORBIA PILULIFERA	..	..	..	..	..	..	..	..	..	..	L	..
Euphorbia Pilulifera	..	..	..	..	..	..	..	..	..	..	..	E
Pill Bearing Spurge	..	..	..	..	..	..	..	..	..	..	S	S
Euphorb. Pitul.	..	..	..	..	..	..	..	..	..	..	A	..
Euphorb.	..	..	..	..	..	..	..	..	..	..	..	A
EXTRACTUM CARNIS	..	..	..	..	..	..	..	..	..	..	L	L
Extract of Beef	..	..	..	..	..	..	..	..	..	..	E	E
Beef Extract	..	..	..	..	..	..	..	..	..	..	S	S
Ext. Carnis.	..	..	..	..	..	..	..	..	..	..	A	A

45—See **DULCAMARA,** U. S. P.
46—See **EUONYMUS,** U. S. P.
47—See **EUPATORIUM,** U. S. P.

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.† 20	30	30*	40	50	60	70	80	90	00	10	20
FARFARA	..	..	..	..	..	..	..	..	..	..	L	L
Coltsfoot	..	..	..	..	..	..	..	..	..	..	E	E
Coltsfoot Leaves	..	..	..	..	..	..	..	..	..	..	S	S
Tussilago Leaves	..	..	..	..	..	..	..	..	..	..	S	S
Farfar	..	..	..	..	..	..	..	..	..	..	A	..
FERRI GLYCEROPHOSPHAS	..	..	..	..	..	..	..	..	..	..	L	L
Ferric Glycerophosphate	..	..	..	..	..	..	..	..	..	..	E	E
Ferric Glycerinophosphate	..	..	..	..	..	..	..	..	..	..	S	S
Ferr. Glycerophos.	..	..	..	..	..	..	..	..	..	..	A	A
FERRI HYPOPHOSPHIS	..	..	..	..	..	..	48	L	L	L	L	L
Hypophosphite of Iron	..	..	..	..	..	..	..	E	E	E	..	..
Ferric Hypophosphite	..	..	..	..	..	..	..	..	..	..	E	E
Ferric Hypophosphite	..	..	..	..	..	..	..	S	S	S	..	..
Ferr. Hypophos.	..	..	..	..	..	..	..	..	..	..	A	A
FERRI LACTAS	..	..	..	..	..	49	49	49	49	..	L	L
Ferrous Lactate	..	..	..	..	..	..	..	..	..	..	E	E
Iron Lactate	..	..	..	..	..	..	..	..	..	..	S	S
Ferr. Lact.	..	..	..	..	..	..	..	..	..	..	A	A
FERRI PYROPHOSPHAS	..	..	..	..	..	50	50	50	50	50	L	L
Ferric Pyrophosphate	..	..	..	..	..	..	..	..	..	..	E	E
Soluble Ferric Pyrophosphate	..	..	..	..	..	..	..	..	..	..	S	S
Ferr. Pyrophos.	..	..	..	..	..	..	..	..	..	..	A	A
FERRUM ALBUMINATUM	..	..	..	..	..	..	..	..	..	..	..	L
Albuminized Iron	..	..	..	..	..	..	..	..	..	..	..	E
Iron Albuminate	..	..	..	..	..	..	..	..	..	..	..	S
Ferr. Album.	..	..	..	..	..	..	..	..	..	..	..	A
FERRUM PEPTONATUM	..	..	..	..	..	..	..	..	..	..	..	L
Peptonized Iron	..	..	..	..	..	..	..	..	..	..	..	E
Iron Peptonate	..	..	..	..	..	..	..	..	..	..	..	S
Ferr. Pepton.	..	..	..	..	..	..	..	..	..	..	..	A
FICUS	51	51	..	51	51	51	51	51	51	51	L	L
Fig	..	..	..	..	..	..	..	..	..	..	E	E
FŒNICULUM	52	52	..	52	52	52	52	52	52	52	52	L
Fennel	..	..	..	..	..	..	..	..	..	..	..	E
Fennel Seed	..	..	..	..	..	..	..	..	..	..	..	S
Fœnic	..	..	..	..	..	..	..	..	..	..	..	A
FRANGULA	..	..	..	..	..	..	..	53	53	53	53	L
Buckthorn Bark	..	..	..	..	..	..	..	..	..	..	..	E
Frang.	..	..	..	..	..	..	..	..	..	..	..	A
FRAXINUS	..	..	..	..	..	..	..	..	..	..	L	..
White Ash Bark	..	..	..	..	..	..	..	..	..	..	E	..
Fraxin	..	..	..	..	..	..	..	..	..	..	A	..
FUCUS	..	..	..	..	..	..	..	..	..	..	L	L
Fucus	..	..	..	..	..	..	..	..	..	..	E	E
Bladderurack	..	..	..	..	..	..	..	..	..	..	S	S
GALANGA	..	..	..	..	..	..	..	..	..	..	L	L
Galanga	..	..	..	..	..	..	..	..	..	..	E	..

48—See **FERRI HYPOPHOSPHIS,** U. S. P. (also U. S. P. 1880, 1890, 1900).
49—See **FERRI LACTAS,** U. S. P.
50—See **FERRI PYROPHOSPHAS SOLUBILIS,** U. S. P.
51—See **FICUS,** U. S. P.
52—See **FŒNICULUM,** U. S. P.
53—See **FRANGULA,** U. S. P.

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.†											
	20	30	30*	40	50	60	70	80	90	00	10	20
Galangal	..	..	..	..	..	..	..	..	..	..	..	E
Galang	..	..	..	..	..	..	..	..	..	..	A	..
GALEGA	..	..	..	..	..	..	..	..	..	..	L	L
Galega	..	..	..	..	..	..	..	..	..	..	E	E
European Goat's Rue	..	..	..	..	..	..	..	..	..	..	S	S
Galeg	..	..	..	..	..	..	..	..	..	..	A	..
GELSEMIUM	..	..	..	..	..	54	54	54	54	54	54	L
Gelsemium	..	..	..	..	..	..	..	..	..	..	..	E
Yellow Jessamine	..	..	..	..	..	..	..	..	..	..	..	S
Yellow Jasmine Root	..	..	..	..	..	..	..	..	..	..	..	S
Gelsem	..	..	..	..	..	..	..	..	..	..	..	A
GERANIUM	55	55	55	55	55	55	55	55	55	55	L	L
Geranium	..	..	..	..	..	..	..	..	..	..	E	E
Cranesbill	..	..	..	..	..	..	..	..	..	..	S	S
Geran	..	..	..	..	..	..	..	..	..	..	A	A
GOSSYPII COXTEX	..	..	..	..	..	56	56	56	56	56	L	L
Cotton Root Bark	..	..	..	..	..	..	..	..	..	..	E	E
Gossyp. Cort	..	..	..	..	..	..	..	..	..	..	A	A
GUAIACUM	57	57	57	57	57	57	57	57	57	57	57	L
Guaiac	..	..	..	..	..	..	..	..	..	..	..	E
Guaiac Resin	..	..	..	..	..	..	..	..	..	..	..	S
Guaiac	..	..	..	..	..	..	..	..	..	..	..	A
GUAIACI LIGNUM	58	58	58	58	58	58	58	58	58	..	L	..
Guaiac Wood	..	..	..	..	..	..	..	..	..	..	E	..
Lignum Vitæ	..	..	..	..	..	..	..	..	..	..	S	..
Guaiac. Lig	..	..	..	..	..	..	..	..	..	..	A	..
GUARANA	..	..	..	..	..	..	..	59	59	59	59	L
Guarana	..	..	..	..	..	..	..	..	..	..	..	E
GUTTA PERCHA	..	..	..	..	..	60	60	60	..	..	L	..
Gutta Percha	..	..	..	..	..	..	..	..	..	..	E	..
HÆMATOXYLON	61	61	61	61	61	61	61	61	61	61	L	L
Hæmatoxylon	..	..	..	..	..	..	..	..	..	..	E	E
Logwood	..	..	..	..	..	..	..	..	..	..	S	S
Hæmatox	..	..	..	..	..	..	..	..	..	..	A	A
HAMAMELIDIS FOLIA	..	..	..	..	..	..	..	62	62	62	L	L
Hamamelis Leaves	..	..	..	..	..	..	..	..	..	..	E	E
Witch Hazel Leaves	..	..	..	..	..	..	..	..	..	..	S	S
Hamamel. Fol	..	..	..	..	..	..	..	..	..	..	A	A
HELIANTHEMUM	..	..	..	..	63	63	63	..	..	..	L	..
Helianthemum	..	..	..	..	..	..	..	..	..	..	E	..
Rock-rose	..	..	..	..	..	..	..	..	..	..	S	..
Frost-weed	..	..	..	..	..	..	..	..	..	..	S	..
Helianth	..	..	..	..	..	..	..	..	..	..	A	..

54—See **GELSEMIUM**, U. S. P.
55—See **GERANIUM**, U. S. P.
56—See **GOSSYPII CORTEX**, U. S. P.
57—See **GUAIACUM**, U. S. P.
58—See **GUAIACUM LIGNUM**, U. S. P.
59—See **GUARANA**, U. S. P.
60—See **GUTTA PERCHA**, U. S. P.
61—See **HÆMATOXYLON**, U. S. P.
62—See **HAMAMELIDIS FOLIA**, U. S. P.
63—See **HELIANTHEMUM**, U. S. P.

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.† 20	30	30*	40	50	60	70	80	90	00	10	20
HELONIAS	..	..	..	..	..	..	..	..	..	..	L	L
Helonias	..	..	..	..	..	..	..	..	..	..	E	E
False Unicorn	..	..	..	..	..	..	..	..	..	..	S	S
Helon	..	..	..	..	..	..	..	..	..	..	A	..
HUMULUS	64	64	64	64	64	64	64	64	64	64	64	L
Hop	..	..	..	..	..	..	..	..	..	..	..	E
Humul	..	..	..	..	..	..	..	..	..	..	..	A
HYDRANGEA	..	..	..	..	..	..	..	..	..	..	L	L
Hydrangea	..	..	..	..	..	..	..	..	..	..	E	E
Seven Barks	..	..	..	..	..	..	..	..	..	..	S	S
Hydrag	..	..	..	..	..	..	..	..	..	..	A	A
HYDRARGYRI SUBSULPHAS FLAVUS	65	65	65	65	65	65	65	65	65	L	..	..
Yellow Mercuric Sulphate	..	..	..	..	..	..	..	..	..	E	..	..
Turpeth Mineral	..	..	..	..	..	..	..	..	..	S	..	..
HYDRARGYRI OXIDUM RUBRUM	66	66	66	66	66	66	66	66	66	66	66	L
Red Mercuric Oxide	..	..	..	..	..	..	..	..	..	..	..	E
Red Precipitate	..	..	..	..	..	..	..	..	..	..	..	S
Hydrarg. Oxid. Rub	..	..	..	..	..	..	..	..	..	..	..	A
HYDRASTINÆ HYDROCHLORIDUM	..	..	..	..	..	..	..	..	..	..	67	L
Hydrastine Hydrochloride	..	..	..	..	..	..	..	..	..	..	..	E
Hydrastine Chloride	..	..	..	..	..	..	..	..	..	..	..	S
Hydrastin. Hydrochl	..	..	..	..	..	..	..	..	..	..	..	A
IGNATIA	..	..	..	..	..	68	68	68	..	..	L	L
Ignatia	..	..	..	..	..	..	..	..	..	..	E	E
Ignatia Amara	..	..	..	..	..	..	..	..	..	..	S	S
Saint Ignatius Bean	..	..	..	..	..	..	..	..	..	..	S	S
Ignat	..	..	..	..	..	..	..	..	..	..	A	A
INULA	69	69	69	69	69	69	69	69	69	69	L	L
Inula	..	..	..	..	..	..	..	..	..	..	E	E
Elecampane	..	..	..	..	..	..	..	..	..	..	S	S
IRIS	70	70	..	70	70	70	70	..	..	..	L	L
Orris	..	..	..	..	..	..	..	..	..	..	E	E
Orris Root	..	..	..	..	..	..	..	..	..	..	S	S
IRIS VERSICOLOR	71	71	71	71	71	71	71	71	..	..	L	L
Blue Flag	..	..	..	..	..	..	..	..	..	..	E	E
Iris Vers	..	..	..	..	..	..	..	..	..	..	A	A
JUGLANS	72	72	72	72	72	72	72	72	72	..	L	L
Juglans	..	..	..	..	..	..	..	..	..	..	E	E
Butternut Bark	..	..	..	..	..	..	..	..	..	..	S	S
Juglan	..	..	..	..	..	..	..	..	..	..	A	..
JUNIPERUS	73	73	73	73	73	73	73	..	..	..	L	L
Juniper Berries	..	..	..	..	..	..	..	..	..	..	E	E
Junip	..	..	..	..	..	..	..	..	..	..	A	A

64—See **HUMULUS**, U. S. P.
65—See **HYDRARGYRI SUBSULPHAS FLAVUS**, U. S. P.
66—See **HYDRARGYRI OXIDUM RUBRUM**, U. S. P.
67—See **HYDRASTINÆ HYDROCHLORICUM**, U. S. P.
68—See **IGNATIA**, U. S. P.
69—See **INULA**, U. S. P.
70—See **IRIS FLORENTINA**, U. S. P.
71—See **IRIS**, U. S. P.
72—See **JUGLANS**, U. S. P.
73—See **JUNIPERIS**, U. S. P.

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.† 20	30	30*	40	50	60	70	80	90	00	10	20
KAOLINUM	..	..	..	..	..	..	..	..	..	74	L	L
Kaolin	..	..	..	..	..	..	..	..	..	..	E	E
KAVA	..	..	..	..	..	..	..	..	..	..	L	L
Kava	..	..	..	..	..	..	..	..	..	..	E	E
Methysticum	..	..	..	..	..	..	..	..	..	..	S	S
Kava Kava	..	..	..	..	..	..	..	..	..	..	S	S
Kava	..	..	..	..	..	..	..	..	..	..	A	..
Kav	..	..	..	..	..	..	..	..	..	..	..	A
KOLA	..	..	..	..	..	..	..	..	..	..	L	L
Kola	..	..	..	..	..	..	..	..	..	..	E	E
Cola	..	..	..	..	..	..	..	..	..	..	S	S
Kola	..	..	..	..	..	..	..	..	..	..	A	..
Kol	..	..	..	..	..	..	..	..	..	..	..	A
KRAMERIA	..	75	75	75	75	75	75	75	75	75	L	75
Krameria	..	..	..	..	..	..	..	..	..	..	E	..
Rhatany	..	..	..	..	..	..	..	..	..	..	S	..
Kramer	..	..	..	..	..	..	..	..	..	..	A	..
LAC. VACCINUM	..	..	..	..	..	..	..	..	..	..	L	L
Cow's Milk	..	..	..	..	..	..	..	..	..	..	E	E
LAPPA	..	..	..	..	76	76	76	76	76	76	L	L
Lappa	..	..	..	..	..	..	..	..	..	..	E	E
Burdock Root	..	..	..	..	..	..	..	..	..	..	S	S
Lapp	..	..	..	..	..	..	..	..	..	..	..	A
LEPTANDRA	..	..	..	..	..	77	77	77	77	77	L	L
Leptandra	..	..	..	..	..	..	..	..	..	..	E	E
Culver's Root	..	..	..	..	..	..	..	..	..	..	S	S
Leptand	..	..	..	..	..	..	..	..	..	..	A	A
LITHII BENZOAS	..	..	..	..	..	..	..	78	78	78	..	L
Lithium Benzoate	..	..	..	..	..	..	..	..	..	..	..	E
Lith. Benz	..	..	..	..	..	..	..	..	..	..	..	A
LITHII BROMIDUM	..	..	..	..	..	..	..	79	79	79	79	L
Lithium Bromide	..	..	..	..	..	..	..	..	..	..	..	E
Lith. Brom	..	..	..	..	..	..	..	..	..	..	..	A
LITHII CARBONAS	..	..	..	..	..	80	80	80	80	80	80	L
Lithium Carbonate	..	..	..	..	..	..	..	..	..	..	..	E
Lith. Carb	..	..	..	..	..	..	..	..	..	..	..	A
LITHII CITRAS	..	..	..	..	..	..	81	81	81	81	81	L
Lithium Citrate	..	..	..	..	..	..	..	..	..	..	..	E
Lith. Cit	..	..	..	..	..	..	..	..	..	..	..	A
LITHII SALICYLAS	..	..	..	..	..	..	..	82	82	82	L	L
Lithium Salicylate	..	..	..	..	..	..	..	..	..	..	E	E
Lith. Salicyl	..	..	..	..	..	..	..	..	..	..	A	A
LUPULINUM	..	83	..	83	83	83	83	83	83	83	L	L
Lupulin	..	..	..	..	..	..	..	..	..	..	E	E
Lupul	..	..	..	..	..	..	..	..	..	..	A	..

74—See **KAOLINUM**, U. S. P.
75—See **KRAMERIA**, U. S. P.
76—See **LAPPA**, U. S. P.
77—See **LEPTANDRA**, U. S. P.
78—See **LITHII BENZOAS**, U. S. P.
79—See **LITHII BROMIDIUM**, U. S. P.
80—See **LITHII CARBONAS**, U. S. P.
81—See **LITHII CITRAS**, U. S. P.
82—See **LITHII SALICYLAS**, U. S. P.
83—See **LUPULINUM**, U. S. P.

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.† 20	30	30*	40	50	60	70	80	90	00	10	20
MACIS	..	..	..	..	84	84	84	84	84	..	L	..
Mace	..	..	..	..	..	..	..	..	..	..	E	..
MAGNESII CHLORIDUM	..	..	..	..	..	..	..	..	..	..	L	L
Magnesium Chloride	..	..	..	..	..	..	..	..	..	..	E	E
Magnes. Chlorid	..	..	..	..	..	..	..	..	..	..	A	A
MALVÆ FOLIA	..	..	..	..	..	..	..	..	..	..	L	L
Mallow Leaves	..	..	..	..	..	..	..	..	..	..	E	E
Malv. Fol	..	..	..	..	..	..	..	..	..	..	A	A
MANACA	..	..	..	..	..	..	..	..	..	..	..	L
Manaca	..	..	..	..	..	..	..	..	..	..	..	E
Manac	..	..	..	..	..	..	..	..	..	..	..	A
MANGANI CITRAS SOLUBILIS	..	..	..	..	..	..	..	..	..	..	L	L
Soluble Manganese Citrate	..	..	..	..	..	..	..	..	..	..	E	E
Manganese and Sodium Citrate	..	..	..	..	..	..	..	..	..	..	S	S
Mangan. Cit. Sol	..	..	..	..	..	..	..	..	..	..	A	A
MANGANI GLYCEROPHOSPHAS SOLUBILIS	..	..	..	..	..	..	..	..	..	..	L	L
Soluble Manganese Glycerophosphate	..	..	..	..	..	..	..	..	..	..	E	E
Soluble Manganous Glycerinophosphate	..	..	..	..	..	..	..	..	..	..	S	S
Mangan. Glycerophos. Sol	..	..	..	..	..	..	..	..	..	..	A	A
MANGANI HYPOPHOSPHIS	..	..	..	..	..	..	..	..	..	85	L	L
Manganese Hypophosphite	..	..	..	..	..	..	..	..	..	..	E	E
Mangan. Hypophos	..	..	..	..	..	..	..	..	..	..	A	A
MANGANI SULPHAS	..	..	..	..	..	86	86	86	86	86	L	..
Manganese Sulphate	..	..	..	..	..	..	..	..	..	..	E	..
Mangan. Sulph	..	..	..	..	..	..	..	..	..	..	A	..
MASTICHE	..	..	..	..	..	87	87	87	87	87	L	L
Mastic	..	..	..	..	..	..	..	..	..	..	E	E
Mastic	..	..	..	..	..	..	..	..	..	..	A	..
MATICO	..	..	..	..	..	88	88	88	88	88	L	L
Matico	..	..	..	..	..	..	..	..	..	..	E	E
Matic	..	..	..	..	..	..	..	..	..	..	A	A
MELILOTUS	..	..	..	..	..	..	..	..	..	..	L	L
Melilot	..	..	..	..	..	..	..	..	..	..	E	E
Yellow Melilot	..	..	..	..	..	..	..	..	..	..	S	S
Yellow Sweet Clover	..	..	..	..	..	..	..	..	..	..	S	S
Melilot	..	..	..	..	..	..	..	..	..	..	A	A
MENYANTHES	89	89	..	..	..	..	..	..	..	..	L	..
Menyanthes	..	..	..	..	..	..	..	..	..	..	E	..
Buckbean	..	..	..	..	..	..	..	..	..	..	S	..
Marsh Trefoil	..	..	..	..	..	..	..	..	..	..	S	..
Menyanth	..	..	..	..	..	..	..	..	..	..	A	..
MITCHELLA	..	..	..	..	..	..	..	..	..	..	..	L
Squaw Vine	..	..	..	..	..	..	..	..	..	..	..	E
Mitchel	..	..	..	..	..	..	..	..	..	..	..	A
MYRCIA	..	..	..	..	..	..	..	..	..	..	L	L
Baybury Bark	..	..	..	..	..	..	..	..	..	..	E	E

84—See **MACIS,** U. S. P.
85—See **MANGANI HYPOPHOSPHIS,** U. S. P.
86—See **MANGANI SULPHAS,** U. S. P.
87—See **MASTICHE,** U. S. P.
88—See **MATICO,** U. S. P.
89—See **MENYANTHES,** U. S. P.

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.†											
	20	30	30*	40	50	60	70	80	90	00	10	20
Wax Myrtle Bark	..	..	..	..	..	..	..	..	..	..	..	S
Myric	..	..	..	..	..	..	..	..	..	..	..	A
OLEUM AURANTII AMARI	..	..	..	..	..	..	..	..	..	..	L	L
Oil of Bitter Orange	..	..	..	..	..	..	..	..	..	..	E	E
Ol. Aurant. Amar.	..	..	..	..	..	..	..	..	..	..	A	A
OLEUM AURANTII FLORUM	..	..	..	..	..	..	..	90	90	..	L	L
Oil of Orange Flowers	..	..	..	..	..	..	..	..	..	..	E	E
Oil of Neorli	..	..	..	..	..	..	..	..	..	..	S	S
Ol. Aurant. Flor.	..	..	..	..	..	..	..	..	..	..	A	A
OLEUM BERGAMOTTÆ	..	..	..	91	91	91	91	91	91	..	L	L
Oil of Bergamot	..	..	..	..	..	..	..	..	..	..	E	E
Ol. Bergam.	..	..	..	..	..	..	..	..	..	..	A	A
OLEUM BETULÆ EMPYREUMATICUM RECTIFICATUM	..	..	..	..	..	..	..	..	..	..	L	L
Rectified Oil of Birch Tar	..	..	..	..	..	..	..	..	..	..	E	E
Rectified Empyroligneous Oil of Birch	..	..	..	..	..	..	..	..	..	..	S	..
Oleum Rusci Rectificatum	..	..	..	..	..	..	..	..	..	..	S	..
Ol. Bet. Empyr. Rect.	..	..	..	..	..	..	..	..	..	..	A	A
OLEUM CARDAMOMI	..	..	..	..	..	..	..	..	..	..	L	L
Oil of Cardamon	..	..	..	..	..	..	..	..	..	..	E	E
Ol. Cardam	..	..	..	..	..	..	..	..	..	..	S	S
OLEUM MYRCIÆ	..	..	..	..	..	..	..	92	92	..	L	L
Oil of Bay	..	..	..	..	..	..	..	..	..	..	S	S
Oil of Myrcia	..	..	..	..	..	..	..	..	..	..	E	E
Ol. Myrc.	..	..	..	..	..	..	..	..	..	..	A	A
OLEUM PIMENTÆ	93	93	93	93	93	93	93	93	93	93	93	L
Oil of Pimenta	..	..	..	..	..	..	..	..	..	..	..	E
Oil of Allspice	..	..	..	..	..	..	..	..	..	..	..	S
Pimento Oil	..	..	..	..	..	..	..	..	..	..	..	S
Ol. Piment.	..	..	..	..	..	..	..	..	..	..	..	A
OLEUM SESAMI	94	94	..	94	94	94	94	94	94	..	94	L
Sesame Oil	..	..	..	..	..	..	..	..	..	..	..	E
Benne Oil	..	..	..	..	..	..	..	..	..	..	..	S
Teel Oil	..	..	..	..	..	..	..	..	..	..	..	S
Ol. Sesam.	..	..	..	..	..	..	..	..	..	..	..	A
OLEUM THYMI	..	..	..	..	..	95	95	95	95	95	95	L
Oil of Thyme	..	..	..	..	..	..	..	..	..	..	..	E
Thyme Oil	..	..	..	..	..	..	..	..	..	..	..	S
Ol. Thymi	..	..	..	..	..	..	..	..	..	..	..	A
ORTHOCRESOL	..	..	..	..	..	..	..	..	..	..	..	L
Orthocresol	..	..	..	..	..	..	..	..	..	..	..	E
OVI ALBUMEN RECENS	..	..	..	..	..	..	..	..	..	..	L	L
Fresh Egg Albumen	..	..	..	..	..	..	..	..	..	..	E	E
Ovi. Album.	..	..	..	..	..	..	..	..	..	..	A	A
OVI VITELLUM RECENS	..	..	..	..	..	..	..	..	..	..	L	L
Fresh Egg Yolk	..	..	..	..	..	..	..	..	..	..	E	E
Ovi Vitel.	..	..	..	..	..	..	..	..	..	..	A	A

90—See **OLEUM AURANTII FLORUM,** U. S. P.
91—See **OLEUM BERGAMOTTE,** U. S. P.
92—See **OLEUM MYRCIÆ,** U. S. P.
93—See **OLEUM PIMENTÆ,** U. S. P.
94—See **OLEUM SESAMI,** U. S. P.
95—See **OLEUM THYMI,** U. S. P.

N. F. Titles, Synonyms and Abbreviations.	Issues of U. S. P. and N. F.†											
	20	30	30*	40	50	60	70	80	90	00	10	20
OVUM GALLINACEUM	..	..	..	..	96	96	96	..	..	..	L	L
Fresh Egg	..	..	..	..	..	..	..	..	..	..	E	E
Ovum Gallin.	..	..	..	..	..	..	..	..	..	..	A	A
PANCREATINUM	..	..	..	..	..	..	..	L	97	97	97	97
Pancreatin	..	..	..	..	..	..	..	E	..	..	..	..
PAPAVERIS FRUCTUS	..	..	..	98	98	98	98	..	..	..	L	..
Poppy Capsule	..	..	..	..	..	..	..	..	..	..	E	..
Papav. Fruct.	..	..	..	..	..	..	..	..	..	..	A	..
PARACOTO	..	..	..	..	..	..	..	..	..	..	L	..
Paracoto	..	..	..	..	..	..	..	..	..	..	E	..
Paracot.	..	..	..	..	..	..	..	..	..	..	A	..
PAREIRA	..	..	..	99	99	99	99	99	99	99	L	L
Pareira	..	..	..	..	..	..	..	..	..	..	E	E
Pareira Brava	..	..	..	..	..	..	..	..	..	..	S	S
Pareir.	..	..	..	..	..	..	..	..	..	..	..	A
PASSIFLORA	..	..	..	..	..	..	..	..	..	..	L	L
Passion Flower	..	..	..	..	..	..	..	..	..	..	E	E
Passion Vine	..	..	..	..	..	..	..	..	..	..	S	S
Passiflor.	..	..	..	..	..	..	..	..	..	..	A	A
PEPSINUM	..	..	..	..	..	..	..	L	100	100	100	100
Pepsin	..	..	..	..	..	..	..	E	..	..	..	..
PERSIO	..	..	..	..	..	..	..	..	..	..	L	L
Cudbear	..	..	..	..	..	..	..	..	..	..	E	E
PETROSELINI RADIX	..	..	..	..	..	..	..	..	..	..	L	..
Parsley Root	..	..	..	..	..	..	..	..	..	..	E	..
Petrosel. Rad.	..	..	..	..	..	..	..	..	..	..	A	..
PHYTOLACCA	101	101	101	101	101	101	101	101	101	101	L	L
Phytolacca	..	..	..	..	..	..	..	..	..	..	E	E
Poke Root	..	..	..	..	..	..	..	..	..	..	S	S
Phytolac.	..	..	..	..	..	..	..	..	..	..	A	A
PIMENTA	102	102	..	102	102	102	102	102	102	102	L	L
Pimenta	..	..	..	..	..	..	..	..	..	..	E	E
Allspice	..	..	..	..	..	..	..	..	..	..	S	S
Piment.	..	..	..	..	..	..	..	..	..	..	A	A
PIMPINELLA	..	..	..	..	..	..	..	..	..	..	L	..
Pimpinella	..	..	..	..	..	..	..	..	..	..	E	..
Pimpernel Root	..	..	..	..	..	..	..	..	..	..	S	..
Pimpinell.	..	..	..	..	..	..	..	..	..	..	A	..
Pinus Alba	..	..	..	..	..	..	..	..	..	..	L	L
White Pine Bark	..	..	..	..	..	..	..	..	..	..	E	E
Pinus Alb.	..	..	..	..	..	..	..	..	..	..	A	..
Pin. Alb.	..	..	..	..	..	..	..	..	..	..	..	A
PIPER	103	103	103	103	103	103	103	103	103	103	103	L
Pepper	..	..	..	..	..	..	..	..	..	..	..	E
Black Pepper	..	..	..	..	..	..	..	..	..	..	..	S

96—See **OVUM**, U. S. P.
97—See **PANCREATINUM**, U. S. P.
98—See **PAPAVER**, U. S. P.
99—See **PAREIRA**, U. S. P.
100—See **PEPSINUM**, U. S. P.
101—See **PHYTOLACCA**, U. S. P.
102—See **PIMENTA**, U. S. P.
103—See **PIPER**, U. S. P.

(To be continued)

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, R. P. FISCHELIS, H. C. CHRISTENSEN, J. A. KOCH, J. H. BEAL, W. B. DAY. *Ex-Officio Members:* T. J. Bradley, *President;* GEORGE JUDISCH, A. G. HULETT, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* JACOB DINER, *Chairman of the House of Delegates.*

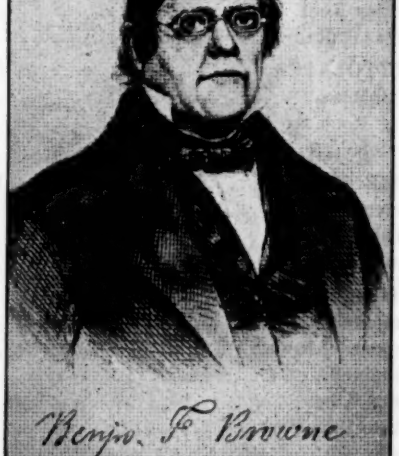
Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; W. L. SCOVILLE, *Chairman,* N. F. Revision Committee; the Chairmen of the Sections, A. PH. A.; JOHN C. KRANTZ, JR., H. M. FASER, ADLEY B. NICHOLS, BERNARD M. KEENE, W. F. SUDRO; D. B. R. JOHNSON, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; WILFORD HARRISON, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P.

THE LISTER CENTENARY: A PHARMACIST COLLABORATOR WITH LISTER.

The following particulars are taken from a biographical sketch of Mr. William Greig, J. P. M. P. S., proprietor of the New Apothecaries Company, Glasgow, in "The Chemists' and Druggists' Year-Book" for Scotland for 1925. "Mr. Greig, who is a hale and hearty veteran of 81, was personally connected with Lister in his early experiments for the production of antiseptic surgical dressings, many of which were carried out in the laboratory of the New Apothecaries' Hall, Glassford Street. Lister at that time was one of the surgeons at the Glasgow Royal Infirmary, and his original idea seems to have been to use some kind of plaster. He visited the New Hall twice a week, and usually remained about two hours, while his wife sat knitting in the carriage and pair at the door. At first an ointment prepared from lead plaster was tried, but this did not answer; next came a preparation of shellac on tinfoil, which was also a failure. Then an attempt was made to spread a plaster on guttapercha tissue. Lister was warned that this was impracticable but was not convinced until after ocular demonstration. Finally, a carbolized plaster was produced, which proved fairly satisfactory. This was used largely in Lister's own practice, and as he described it and its applications in communications to the medical Press, this created a large demand for the plaster both at home and abroad. It was not until later that Lister, who was a born experimentalist, hit on the brilliant idea of impregnating gauze with various antiseptic solutions."

HAWTHORNE'S "PRIVATEER."—AN APOTHECARY.

"Papers of an Old Dartmoor Prisoner" were published in the *Democratic Review* by Nathanial Hawthorne. These recounted the experiences of a young American privateersman on sea and land during the War of 1812. Once these papers were credited to Hawthorne, until the manuscript copy disproved his authorship. Recently the papers were published in "The Yarn of a Yankee Privateer," but the author was unknown until quite recently when convincing proof established the fact that Benjamin F. Browne, a Salem, Mass.,



apothecary was the author and the "Yankee Privateer." An account of the search to find out the author and a sketch of him is published in the *Literary Digest* for April 9, 1927. Permission to abstract and use the half-tone has been kindly granted by the publishers—Funk & Wagnalls Co.

Benjamin F. Browne was born in 1793, in Salem, Mass.—the early home of the late former Treasurer of the A. PH. A., S. A. D. Sheppard. His ancestry is traced back seven generations to John Browne, who joined the first church in Salem, in 1637. Benjamin F. Browne was apprenticed to a Salem apothecary in 1807, and served five years. He engaged as surgeons' assistant on board the privateer *Alfred*. Later he accepted the position as Captain's clerk on the privateering schooner *Frolic*, which was captured by the English man-of-war *Heron* and the crew held in Barbados for a time and then sent to England (Dartmoor) on the ship Benbow, Captain Shortland. The sufferings he endured are related in the memoir. On May 1, 1815, he was released and returned to Salem, where he reëntered the drug business, prospered and took an active interest in the religious, political and social life of his city. He became State Senator, and served as postmaster of Salem from 1845–1849. After retirement from the drug business he indulged in literary and historical pursuits. He died in Salem in 1873.

CENTENARY OF INVENTION OF FRICTION MATCHES.

E. C. Bennison, President of Birmingham (England) Pharmaceutical Association, in a letter to the Editor of the *Pharmaceutical Journal and Pharmacist*, under date of April 12th, states that while an apprentice of the late William Hardcastle, Stockton-on-Tees, who purchased the stock and records of the pharmacy of John Walker—he successfully searched the archives of the store for the historic day-book, wherein the first sale of "friction lights," on April 1827, to John Hixon is recorded. It seems, a controversy arose over the question of who invented the friction match and the finding of the day-book settled the question for all time.

We are advised there is no photograph of John Walker obtainable, he was the son of a Stockton tradesman; educated as a surgeon, he afterward qualified as a druggist and set up in business in 1819. The invention of the "friction light" was the product of an experimental mind; frequently called upon to supply a percussion powder containing potassium chlorate for hunters and sportsmen prompted the druggist to prepare sticks with the chemical which for ignition were dipped into sulphuric acid; next came the application of friction to produce ignition. None of the matches made by John Walker contained phosphorus; the use of the latter for "lucifers" may be credited to Charles Sauria, a French student in chemistry at Dôle, in the Jura.

For philanthropic reasons John Walker did not take out a patent for his invention and very soon others entered the business and improved on the "friction light." He died in May 1859. A memorial is to be placed in Stockton, a tablet marks the site where this pharmacist-inventor had his shop.

WORLD TRADE NOTES ON CHEMICALS AND ALLIED PRODUCTS.

Large Brazilian Insecticide and Disinfectant Trade.—Insecticides and disinfectants are largely used in Brazil owing to the presence of ants, mosquitoes, ticks and other forms of insect life. The principal disinfectants for household use in "Cruzwaldinha" manufacture in Brazil, and "Pearsons" imported from Great Britain. The majority of animal dips are at present supplied by Great Britain in barrels or drums.

Alleged Discovery for Producing Inorganic Acids.—Two French chemists report that they have acquired exclusive rights to new formulas for producing formic, oxalic, lactic acid and ethyl lactate. It is claimed that the three acids produced by their process can be sold at 5 francs per kilo with a profit of 30 per cent and that ethyl lactate can be produced for sale at 30 francs per kilo with a profit of 20 francs. The present approximate value of the franc is $0.0391. The names of the French chemists are available to interested American firms by request to the Chemical Division, Bureau of Foreign and Domestic Commerce, Washington, D. C. The Bureau has not investigated the alleged discoveries and cannot assume any responsibility as to their commercial value, or express an opinion of the merits of the method. (Commercial Attache C. L. Jones, Paris.)

Drugs and Disinfectants Bill Introduced into South African Parliament.—A bill has been introduced in the South African Parliament by the Minister of Public Health, to con-

solidate and amend the laws relating to the importation and sale of drugs and disinfectants. The sale of any drugs adulterated or falsely described is prohibited and provisions will be made concerning the use of preservatives or coloring matters. All imported drugs or disinfectants may be detained and examined to see that they conform to the regulations. In the case of disinfectants a label must be attached, stating the names of the active ingredients, the percentage or proportion of each of the efficacy of the disinfectant expressed in definite numerical terms, as compared with a standard prescribed by regulations, and the name and address of the manufacturer or his agent.

New German Dye Trust Anaesthetic.—Berlin surgeons reported favorably, at a meeting of the Berlin Medical Society on March 23rd, on a new Dye Trust (I. G.) anæsthetic, known so far as "E 107." This is said to be a bromine preparation with the advantage of being introduced in solutions rectally into the intestinal canal, producing general anaesthesia.

Subjectively, "E 107," with almost instantaneous effect, is said to relieve the patient of the anguish and excitement often accompanying the taking of other anaesthetics. Heart and pulse are said to remain normal and a blood pressure is not reduced, nor are nerves or lungs damaged in the taking. Even patients over 70 years of age have taken it without disturbance. No disagreeable after effects were observed. Objectively, its use relieves the surgeon of wearing a mask while at work. Chloroform, ether and other anaesthetics can be given additionally in special cases.

A final appraisal of the new anaesthetic is not given as yet, because of lack of entire agreement in the profession, and further experiments are awaited. The majority, however, characterize "E 107" as an advance beyond other inhalation anaesthetics, and foresee its acceptance by the profession. (Trade Commissioner William T. Daugherty.)

THE WELLCOME HISTORICAL MEDICAL MUSEUM.

A COLLECTION ILLUSTRATING THE HISTORY OF MEDICINE AND ALLIED SCIENCES THROUGHOUT THE WORLD FROM PREHISTORIC TIMES.

We are indebted to **Mr. Henry S. Wellcome** for a copy of an illustrated volume of the Wellcome Bureau of Scientific Research and Museum of Medical Science, including Tropical Medicine and Hygiene.

The Wellcome Historical Medical Museum contains an extensive collection of rare objects, pictures, sculptures, manuscripts, early printed books, etc., illustrating the evolution and practice of Medicine and Allied Sciences throughout the world from prehistoric times, and includes a section dealing with primitive medicine, surgery and the healing arts among savage and semi-civilized peoples of to-day.

Special sections are devoted to Memorial Collections of objects originated by, used by, or associated with eminent men who have made history by their great achievements in medical science. These include Dr. Edward Jenner's relics, original manuscripts, instruments, etc., connected with his development of vaccine treatment for small-pox, and also Lord Lister's original appliances, chemical reagents and other materials which he used in the development of his methods of antiseptic surgery as practiced by him in the "Lister Ward" of the Glasgow Infirmary and elsewhere. A portion of the original "Lister Ward," reconstructed from the actual material and fitted with the original equipment, forms an important exhibit in the Museum.

The aim and purpose of the Founder are to render the collections of real educative value and to make them helpful to research workers, students and others interested in the History of Medicine and Allied Sciences.

The Museum was reopened at a Ceremony presided over by Sir Humphry Rolleston, Bt., K.C.B., M.A., M.D., F.R.C.P., Regius Professor of Physic, University of Cambridge. In the unavoidable, and deeply regretted, absence of the Founder (Mr. Henry S. Wellcome) the guests were received by Sir Humphry Rolleston and Dr. John D. Comrie, M.A., F.R.C.P., F.S.A., Lecturer on the History of Medicine, Edinburgh University.

LISTER CENTENARY EXHIBITION.

The official Lister Centenary Exhibition, held at the Wellcome Historical Medical Museum, 54A, Wigmore Street, was inaugurated by a Reception on Thursday, April 7, 1927, at which the guests were received by Sir W. Watson Cheyne, Bt., K.C.M.G., C.B., D.Sc., LL.D., M.B., C.M., F.R.C.S., F.R.S., who was supported by Sir St.Clair Thomson, M.D., F.R.C.P., F.R.C.S., and by Professor Archibald Young, B.Sc., M.B., C.M., F.R.F.P.S., Regius Professor of Surgery, University

of Glasgow. They were assisted by C. M. Wenyon, Esq., C.M.G., C.B.E., M.B., B.Sc., Director-in-Chief, Wellcome Bureau of Scientific Research; S. H. Daukes, Esq., O.B.E., B.A., M.B., D.P.H., Director of Museum, Wellcome Bureau of Scientific Research; and L. W. G. Malcolm, Esq., M.Sc., F.R.S.E., Conservator, Wellcome Historical Medical Museum.

Over 400 distinguished guests were present.

A MUSEUM FOR PHARMACY.

At the A. PH. A. meeting, Dr. Edward Kremers said in part:

"There are two types of museums to which the attention of this Section might well be directed. The first, and older, is the pharmacy unit in the Germanisches Museum in Nuernberg. It consists of an historical 'Apotheke,' a laboratory, and a 'Material-kammer.' Some years ago upon the return from one of his European trips, Professor Haskins, whose 'Mediaeval Science' appeared in book form within the last twelvemonth, told me how he had enjoyed the Germanic Museum and that he thought more of the pharmaceutical unit than of any other. Not so long ago, the Secretary of the American Association of Museums visited Madison and, while inspecting the Museum of the Wisconsin Historical Society, told the Curator that the Historical Drug Store was its best unit. Now the Wisconsin Historical Drug Store does not begin to compare, in a way, with the 'Historische Apotheke' of the Germanic Museum, yet this dictum by an expert reveals the possibilities in this direction.

"The second type of museum is represented by the 'Deutsches Museum' in Munich, the new home of which was recently dedicated. I had the pleasure of visiting this museum in 1907, hence many years before it had acquired its present greatness and importance. Yet even then the underlying principles became apparent in well-nigh every unit. By way of illustration, the development of the modern polariscope from the calcite crystal, through the Nichols prism, etc., was illustrated by objects, accompanied by explanatory cards, step by step. Moreover, the visitor was permitted to handle the individual parts as well as the complete instrument for the purpose of studying its principles and application. Such a museum is an educational institution of the first order.

"Take but a single illustration, that of opium, and apply the same principles, and you can conjure up a unit of a museum that would be worthy of the A. PH. A. We have hundreds, indeed thousands, of possibilities of the same kind. The question will not be one of dearth of material but of superabundance. We could well fill the entire building with museum material if we but had the money to collect it and take care of it. But the museum will be but one of our problems. The Historical Section will be equally concerned with the library and the Archives."

REPLICA OF ANCIENT PHARMACY.

A replica of a fifteenth century pharmacy that was exhibited at the Paris Exposition of 1900 has been presented to the physiology department of the University of Cincinnati, where it is installed in the lecture room. The central fountain, designed and modeled by Innocenti Bruno and Prosperi Francesco, is set in the wall between cases containing jars and vases, and in front of the fountain stands the apothecary's counter. The herbs are reproduced pictorially in tiles and in the floor with a remarkable degree of artistry in form and color. The general idea was that of Prof. Carlo Guerrini. The ceramics are the work of the Cantagalli pottery of Florence.

The Bristol (England) Museum has recently purchased a large bronze mortar, 12 inches high by $14\frac{1}{2}$ inches in diameter at the rim, inscribed, "George Smith, Apothecary, Bristol, 1733." The directors of the Museum accept this casting as an evidence that the bronze-casting industry existed in Bristol prior to the date given.

PERSONAL AND NEWS ITEMS.

Prof. Anton Hogstad spoke before the luncheon club of St. Louis druggists at the April meeting on "Pharmacy of To-day To-morrow." He dwelt at length upon the oral administration of drugs and their change reaching the blood current due to the action of stomach secretions and the action of biliary fluid. He referred to the fact that our knowledge of future chemistry will come from investigations of the fresh herb, root and leaf, the growing plant, and urged those interested in plant life to visit the drug garden of the St. Louis College of Pharmacy in Shaw's garden where he had under cultivation a number of new plants.

Frank E. Holliday, General Representative of the N. W. D. A., celebrated the 60th anni-

versary of his entrance into the drug business, April 11th. During his career he has held three positions—as a member of a retail drug firm in Topeka, then associated with the N. A. R. D. and thereafter with the N. W. D. A. He is now taking life easier than in former days and recently returned from a 30-day trip to the British West Indies accompanied by Mrs. Holliday.

Charles F. Matthews, former head of the offices of Sharp & Dohme in Chicago, recently returned from a trip around the world. He was guest at the monthly dinner of the N. Y. Veteran Druggists' Association, on April 5th.

Dr. George C. Diekman, associate dean of Columbia University, College of Pharmacy, has been granted a two-year Sabbatical leave from the college and will be absent during 1927 and 1928. Prof. Diekman has been a member of the faculty in the latter institute for 35 years.

Dr. and Mrs. A. S. Burdick sailed for Europe April 9th. They will be absent for about two months.

Mr. and Mrs. Charles J. Lynn returned from a trip to Japan on March 31st.

Charles H. LaWall, former President of the A. PH. A., and Mrs. LaWall have returned from a two-months' vacation trip during which they traveled through Panama Canal and up the Pacific Coast. The Dean has returned rested and in fine health.

Dr. Irving F. Smith, Sr., pathologist of the laboratory of the U. S. Bureau of Plant Industry, was the guest of honor at the annual dinner of the American Phyto-Pathological Society, held in Philadelphia.

W. L. Crounse, Washington representative for the N. W. D. A., is recuperating and has returned to his desk after an illness of several weeks.

John B. Thomas, prominent pharmacist of Baltimore, has been in poor health for several months. The report is that he is slowly recovering and it is hoped that he will soon regain his health.

J. C. Peacock, of Philadelphia, was a recent visitor at the ASSOCIATION offices.

Carson P. Frailey, Secretary of the American Drug Manufacturers' Association, is recovering from injuries sustained in an automobile accident. Mr. Frailey's collar bone was broken and Mrs. Frailey and their son also sustained injuries.

Prof. Sydney S. Negus, formerly of the University of Richmond, is now a member of the faculty of the Medical College of Virginia.

Editor Hugo Kantrowitz states that the pharmacists' tour of Europe is being arranged for June 30th and asks that those who are contemplating joining the party to advise him promptly of their intention.

F. W. Nitardy left on an extended European trip on May 12th. It is his intention to return early in September and during his sojourn in Europe will visit France, Spain, Italy, Switzerland, Belgium, Holland, England, Germany and Austria.

Dr. William H. Welch, Professor of the History of Medicine at Johns Hopkins Medical School, was awarded the 1927 medal for scientific research in Medicine by the Association of American Physicians.

Dean Frederick J. Wulling is slated for a number of addresses during his visit to the East to attend the U. S. P. convention in Washington, D. C.

Dr. H. Thoms, who visited in this country several years ago on his journey to Japan, will close his twenty-five years of service as Director of the Pharmaceutical Institute of the University of Berlin, this year.

Edward Mallinckrodt of St. Louis is one of the donors of $1,000,000 to establish a radiological institute for the study of cancer at the Washington University School of Medicine in St. Louis.

In a recent issue of the *Barnwell Bulletin,* published under the direction of the vocational guidance Committee of the Central High School of Philadelphia and by the Mary Gaston Barnwell Foundation, there is an article from the pen of former A. PH. A. President **George M. Beringer** on "Pharmacy as a Career." The article is comprehensive and gives an account of the advances made in pharmacy and the drug business, the advantages that are offered to-day, the work pharmacy has done and brief sketches of several pharmacists who have contributed largely to science and the materia medica. The article closes with an outline of the courses in pharmacy schools, the requirements for entrance and graduation and the degrees offered by these institutions.

Everett Lord Bryant, Baltimore artist, recently completed a decorative work for the library of **Dr. A. R. L. Dohme** in his Roland Park home.

Dean Julius A. Koch, of Pittsburgh College of Pharmacy, was the guest of honor at the annual Reunion Banquet of Kappa Psi Phar-

maceutical Fraternity, Beta Kappa Chapter, April 21st. Among the speakers of the occasion were: State Senator Lee S. North, Louis Emanuel, A. F. Judd, Louis Saalbach, F. J. Blumenschein, R. R. Gaw, B. F. Daubert, Wilbur Isenberg, Roy Mahood, John C. Wallace, John R. Thompson, J. C. Simms, George O. Yohe, F. W. McCulloch.

Prof. C. V. Nichols, for a number of years with the school of Pharmacy, Medical College of Virginia, has resigned in order to take active charge of his retail pharmacy in Oklahoma. **Prof. William Clift** has become associated as a partner of Phipps & Bird, Inc., Richmond. **Sidney S. Negus,** a Ph.D. of Johns Hopkins, has been elected to a professorship in chemistry for next session and **Miss Myrtis Jennings,** an honor graduate of the School of Pharmacy, has been added to the hospital dispensing staff.

Dr. Wilmer Krusen, for many years head of the Philadelphia Health Department, has been elected President of the Philadelphia College of Pharmacy and Science. Few physicians in Philadelphia are better and more favorably known than Dr. Krusen, and he is also influential in civic affairs. Those who attended the Philadelphia A. PH. A. meeting will remember his welcoming address in which he spoke highly of pharmacy. This same attachment is always evidenced by him; in earlier years he served an apprenticeship in a pharmacy. Dr. William A. Braisted has retired as President, after a number of years of useful service. It will be remembered that Dr. Braisted is a Past Surgeon General of the Navy.

Fritzsche Brothers, Inc., advise that the firm of Schimmel & Co., manufacturers of scientific oils, etc., founded in 1829, and which has been the property of the Fritzsche family for generations, has taken over, by amalgamation, the establishment of E. Sachsse & Co., of Leipzig.

The Chicago address of the Torsion Balance Co. has been changed to Builders Building, No. 228 N. La Salle St. The new offices are more commodious than at their former location.

John S. Richardson—former member of the AMERICAN PHARMACEUTICAL ASSOCIATION, and father of our fellow member, Lloyd N. Richardson, Bel Air, Md.—died April 2nd, at his residence in Bel Air. He entered the retail drug business in 1894 and retired about two years ago, on account of poor health.

Mr. Richardson married a great-great-granddaughter of President James Monroe. The deceased took a very active part in the social and civic affairs of Harford County where he resided throughout his life. He was one of the leading citizens of his community and highly regarded by every one who came in contact with him.

DR. FREDERICK POWER.

The members of the AMERICAN PHARMACEUTICAL ASSOCIATION will be interested in the following further information relative to our late fellow member, Dr. Frederick B. Power.

"During the eighteen and a half years Dr. Frederick Belding Power resided in London and was Director of the Wellcome Chemical Research Laboratories, specimens illustrating the results of the numerous researches carried out in these laboratories, by and under the direction of Dr. Power, were exhibited in the Scientific Sections of the great International Exhibitions held in Europe and America.

"The jurors of the Scientific Sections of these several International Exhibitions made the following awards for scientific researches in the field of pure science:

"Awarded to Dr. Frederick Belding Power:

One Grand Prize,
Two Diplomas of Honour,
Five Gold Medals,
One Silver Medal.

"Awarded to the Wellcome Chemical Research Laboratories, King Street, London for researches carried out by Dr. Power and members of the staff under his direction:

Twelve Grand Prizes,
Three Diplomas of Honour,
Five Gold Medals.

"The Wellcome Bureau of Scientific Research, Endsleigh Gardens, London, and each of the following associated Wellcome Research Institutions and Museums in England, are under separate and distinct direction, each Institution being under the control of its own Director; but to facilitate close coöperation among the various departments, all of these Institutions are *affiliated with the Bureau.* The Bureau in itself contains twelve well-equipped Research Laboratories where investigations are carried out in all branches of Pathology, Parasitology, Entomology and more especially in reference to Tropical Medicine and Hygiene. This Bureau, under the control of a Director-in-Chief, serves as the central exchange for consultative and advisory conferences among

the Directors and Staffs of these various Institutions.

The affiliated Wellcome Institutions,
Physiological Research Laboratories,
Chemical Research Laboratories,
Historical Medical Museum,
Museum of Medical Science including
Tropical Medicine and Hygiene.

"Furthermore, these several Scientific Research Institutions and Museums bearing Mr. Wellcome's name are conducted on strictly academic lines and should not be confused with, or mistaken for, the various special Industrial Research and Experimental Laboratories connected with the Chemical and Pharmaceutical works of Burroughs, Wellcome & Company, which are entirely separate and distinct from the Wellcome Bureau of Scientific Research and the several affiliated Institutions. Likewise all exhibits and awards are entirely separate and distinct."

We regret that in the obituary notice of the April JOURNAL, A. PH. A., it was stated that Dr. Power had been Scientific Director of the Schimmel & Company Branch near New York, etc., instead of Fritzsche Brothers, Inc.

SOCIETIES AND COLLEGES.

MEETING OF THE BOARD OF TRUSTEES OF THE U. S. P. CONVENTION.

A meeting of the Board of Trustees of the U. S. Pharmacopœial Convention was held in Washington May 13th–14th. All members of the Board were present, except Dr. S. Solis Cohen, who was absent on account of the serious illness of a member of his family. Mrs. H. M. Whelpley and the new Secretary—Samuel C. Henry—attended. Chairman E. Fullerton Cook, U. S. P. Revision Committee, recently returned from Europe.

DECORATION OF BUSTS AND STATUES OF FAMED PHYSICIANS IN WASHINGTON PARKS AND INSTITUTIONS.

On Monday, May 16th, as part of the Convention program of the American Medical Association, memorial meetings were held honoring the following:

Dr. Crawford Long, pioneer in ether anesthesia, physician-pharmacist, Statuary Hall, U. S. Capitol, by Dr. Charles Mayo, Rochester, Minn., introduced by Dr. Thomas Groover, Washington, D. C.

Dr. Benjamin Rush, signer of Declaration of Independence, and Surgeon General, Central Division, Revolutionary Army, in front of Naval Hospital, foot of Twenty-Fourth Street, N. W., by Dr. Edward Martin, Philadelphia, introduced by Dr. C. W. Richardson, Washington, D. C.

Dr. Samuel Gross, famed Philadelphia surgeon and teacher, in the hall near the Army Medical Museum and Library, by Dr. Jabez Jackson, Kansas City, Mo., introduced by Dr. Charles S. White, Washington, D. C.

Bust of Dr. William C. Gorgas, sanitarian of the Panama Canal: Introduction by Surgeon General Merritte W. Ireland, U. S. Army. Placing of wreath by Admiral Edward R. Stitt, Surgeon General, U. S. Navy.

Bust of Dr. Walter Reed, discoverer of the cause of yellow fever: Introduction by Col. Joseph M. Phalen, M.C., U. S. Army. Placing of wreath by Surgeon General Hugh S. Cummings, U.S.P.H.S.

Painting of Dr. John S. Billings, medical bibliographer and designer of Johns Hopkins Hospital: Introduction by Col. Fielding H. Garrison, M.C., U. S. Army, Washington, D. C. Placing of wreath by Dr. William C. Welch.

MEDICINE NEEDS OTHER SCIENCES' AID.

A statement issued April 30th, by Yale University, declared one of the greatest needs of to-day in the warfare against disease to be a closer coöperation between the medical profession and other scientists. The whole subject of chemo-therapeutics is one in which fundamental research must be made, if medicine is to solve the increasing problems of the health of the nation.

REPORT OF THE PHARMACEUTICAL SYLLABUS COMMITTEE.

BULLETIN XL—FINANCIAL STATEMENT.

Receipts.

1924		
Aug. 15	Cash on hand.....	$ 2.00
Oct. 24	Contribution, A. A. C. P...	25.00
Nov. 5	Contribution, N. A. B. P..	25.00
Nov. 17	Contribution, A. PH. A....	25.00
Dec. 31	Sale of Syllabus, 8/15 to date.....	14.50

1925		
Oct. 14	Contribution, A. A. C. P...	50.00
Nov. 6	Contribution, N. A. B. P..	100.00
Dec. 31	Sale of Syllabus, 1925.....	124.10
1926		
Mar. 29	Contribution, A. PH. A....	50.00
Oct. 25	Contribution, A. A. C. P...	50.00
Nov. 3	Contribution, N. A. B. P..	50.00
Dec. 31	Sale of Syllabus, 1926.....	42.00
1927		
Jan. 21	Contribution, A. PH. A....	50.00
Feb. 28	Sale of Syllabus, Jan. 1 to date.....	28.00
Mar. 1	Total since last report.	$635.60

Expenditures.

1924		
Nov. 4	State Street Trust Company, Boston, on account of note.....	$ 13.49
Dec. 18	State Street Trust Company, Boston, on account of principal of note.....	50.00
	Discount on new note.	12.13
1925		
Jan. 21	Postage stamps.....	3.00
May 15	Cartage.....	2.50
June 15	State Street Trust Company, Boston, on account of principal of note.....	50.00
	Discount on new note.	10.68
July 10	Freight and cartage.....	16.35
Oct. 23	Riverdale Press, Brookline, Mass.	
	2000 letterheads.....	10.00
	1000 document envelopes.....	6.50
	1500 supplements to Syllabus.....	18.50
Nov. 3	Postage stamps for circulars.....	20.00
Nov. 24	Postage stamps for correspondence and mailing Syllabus.....	22.00
Dec. 4	Riverdale Press, Brookline, Mass.	
	1500 subscription blanks.....	7.50
Dec. 15	State Street Trust Company, Boston, on account of principal of note.	100.00
	Discount on new note.	7.54
1926		
Jan. 28	Postage stamps.....	5.00
Jan. 30	Exchange on check.....	.10
June 14	State Street Trust Company, Boston, on account of principal of note.	50.00
	Discount on new note.	6.10
Dec. 14	State Street Trust Company, Boston, payment of note in full.....	200.00
1927		
Feb. 17	Postage stamps.....	5.00
Feb. 28	Postage stamps and envelopes.....	6.00
	Total since last report.	$622.39
Mar. 15	Cash on hand.....	$ 13.21

Signed,
T. J. BRADLEY, *Chairman.*

BULLETIN XLI. MARCH 25, 1927.

This may be the final Bulletin of the series pertaining to the third edition of the SYLLABUS and it is devoted to a brief discussion of the present and future work of the Committee.

Membership.—The following changes in membership have occurred since the enclosed list in *Bulletin XXXIX* was prepared.

W. C. Anderson, of Brooklyn, N. Y., has been appointed from the A. PH. A. for the seven-year term ending in 1933, to succeed E. L. Newcomb.

E. F. Cook, of Philadelphia, Pa., has been elected to succeed himself, by the A. A. C. P., for the seven-year term ending in 1933.

A. L. I. Winne, of Richmond, Va., has been elected by the N. A. B. P. for the seven-year term ending in 1933, to succeed G. C. Diekman.

George Judisch, of Ames, Iowa, has been elected by the N. A. B. P. to complete the term of Mathias Noll, expiring in 1929.

C. J. Clayton, of Denver, Colo., has been elected by the N. A. B. P. to complete the term of Frank Schachleiter, expiring in 1931.

Finances.—As stated in the financial report in *Bulletin XL*, the notes for the balance of the cost of issuing the third edition of the SYLLABUS have been fully paid and there is a small amount of cash in the treasury, with no outstanding unpaid bills.

PREPARATION OF A FOURTH EDITION.

As was described in the last annual report to the parent bodies, the adoption of the three-year minimum course in pharmacy, makes necessary another revision of the "SYLLABUS," but this could not be undertaken until several conditions affecting its preparation were ful-

filled. These conditions are the issuance of new editions of the "United States Pharmacopœia" and "The National Formulary," the payment of all debts of the Committee, and the appearance of the report of the Commonwealth Fund investigation of Pharmacy from a functional standpoint. All of these conditions have now been fulfilled in the order named and it is now time to begin the work of revision. The Chairman and Dr. J. A. Koch have been appointed as members of a Special Committee of the A. A. C. P., to confer with Dr. W. W. Charters and other representatives of the Commonwealth Fund on coördination of their report with the work of the colleges of pharmacy. The Chairman, in the light of our experience in the preparation of previous editions, has noted several ways for the possible improvement of the "SYLLABUS." These suggestions will be submitted for the consideration of the Committee, in due course.

CHAIRMANSHIP OF THE COMMITTEE.

The Chairman is aware of his many shortcomings in connection with this work, but he finds some satisfaction in certain tangible results obtained. Appointed a member of the Committee in 1906, soon after its inception, he assisted in the preparation of the first and second editions, and, in 1914, after the second edition appeared, he was elected Secretary-Treasurer, to distribute that edition and clear the books of a debt of about five hundred dollars. In 1917, he was advanced to the Chairmanship and supervised the preparation of the third edition, during the difficult war period. This edition appeared in 1922, and again it was necessary to clear the books of a debt of about five hundred dollars, which has just been accomplished. While still far from being the ideal book we are striving for, the third edition is conceded to be a great improvement over the preceding ones, and the bitterness due to differences of opinion in the Committee has disappeared. It should be remembered that no one is paid for his services on the Committee, and, during the last dozen years, the Massachusetts College of Pharmacy has contributed clerical assistance on the work of the Committee which would probably have cost as much as all the other expenses, if paid for.

The only reason for making the above statement is in connection with the selection of a Chairman, to take charge of the preparation of the fourth edition. The present Chairman feels that he has held the office for a long time and done his share of the work, and he sincerely wishes to relinquish the position. Stated in another way, he will decline to accept a reëlection, unless convinced that it is his unmistakable duty to accept it. Action on this matter will be requested before long, and, in the meantime, an expression of the views of members of the Committee is asked for.

Signed,

T. J. BRADLEY, *Chairman.*

OFFICERS OF THE AMERICAN DRUG MANUFACTURERS' ASSOCIATION.

The 16th annual meeting of the American Drug Manufacturers' Association held in New York City, April 4th to 7th, was largely attended, and is said to have been one of the most successful in the history of the Association.

The officers elected are, *President*, Charles G. Merrell, Cincinnati; *First Vice-President*, A. Homer Smith, Baltimore; *Second Vice-President*, Nicholas H. Noyes, Indianapolis; *Third Vice-President*, J. H. Foy, Newark, N. J.; *Secretary*, Carson P. Frailey, Washington, D. C.; *Treasurer*, Franklin Black, New York; *Members of the Executive Committee*, Oscar W. Smith, Detroit; S. B. Penick, Dr. John F. Anderson, New York City; and Milton Campbell, Philadelphia.

Among the speakers of the occasion as delegates of other organizations were E. F. Kelly for the A. PH. A.; E. L. Newcomb for the N. W. D. A.; Thomas H. Potts, N. A. R. D.; Ralph R. Patch, A. P. M. A.

Charles G. Merrell, elected President of the American Drug Manufacturers' Association, is President of the William S. Merrell Company, Cincinnati, which was founded in 1828 by his grandfather. Mr. Merrell was born August 2, 1867, at Cincinnati, and after attending the Cincinnati High School entered the Massachusetts Institute of Technology, and was graduated in 1884. That fall he joined the company he now heads, organizing the firm's laboratory. He was made plant superintendent in 1892 and Vice-President in 1895. In 1915 he was elected President and still occupies that position.

Mr. Merrell has been a Vice-President of the A. D. M. A. for some years and a member of the executive committee for a still longer period. He has taken a most active part in the conventions for a decade and has been one of the most regular attendants at meetings. He is also a member of the AMERICAN PHARMA-

CEUTICAL ASSOCIATION, American Chemical Society, Cincinnati Chamber of Commerce, Cincinnati Club and Cincinnati Bowling on the Green Club.

EUROPEAN PHARMACEUTICAL ASSOCIATIONS (NATIONAL).

PRESIDENTS AND SECRETARIES.

France.—Association générale des Syndicats pharmaceutiques de France.—*President*, M. Barthet, Rue de Phalsbourg 1 Paris. *Secretary.*—M. Collard, Rue Ballu 13 Paris.

Spain.—Union Farmaceutica Naçional.—*President*, D. Juan Rhodes Garridom Cabanilla del Campo, Guadalajara. *Secretary*, D. Emiliano Colmenar, Alberto Auguilera, Madrid. Bureau. Cardenal Cisneros, 56 Madrid.

Italy.—Sindicato Nationale Fascisti die Farmacisti, Via di Lucchesi. 31 Rome.

Switzerland.—Schweizerischer Apothekerverein.—*President*, J. Lang, Davos. *Secretary*, Dr. H. Spillmann, Zürich, Weinbergstrasse 97.

Belgium.—La Nationale Pharmaceutique.—Bureau. Avenue de Cortenbergh, 24 Bruxelles. *President*, Valère Haazen, Avenue Isabelle, Anvers. *Secretary*, J. Breugelmans, Rue de Veeweyde, 5 Bruxelles.

Holland.—Ned. Maatschappy, ter Bevordering der Pharmacie. *President*, Dr. J. J. Hofman, Schenkweg 4, La Haye. *Secretary*, V. van Itallie, Nicolaas Beetsstraat 130, Amsterdam.

England.—Pharmaceutical Society of Great Britain.—*President*, Fred E. Bilson, Lansdowne Crescent, Bournemouth. *Secretary*, Hugh N. Linstead, Bloomsbury Square 17, London, W. C.

Germany.—Deutscher Apotheker Verein.—Bureau. Levetzowstrasse, 16 B. Berlin, Vereinshaus. *President*, Dr. H. Salzmann, Joachimsthalerstrasse, 22 Berlin, W. 15.

Austria.—Allgemeiner Oesterreichischer Apothekerverein.—*President*, Dr. Franz Stohr, Wien. *Secretary*, M. F. Minarik, Apotheker in Wien.

NEW YORK STATE PHARMACEUTICAL ASSOCIATION.

Chairman Samuel S. Dworkin has arranged a pamphlet on price standardization which will be of great help to Association workers; it contains the following articles: "Chain Stores and the Drift Toward Monopoly in the Retail Field," by Clyde L. Eddy; "The Sherman Law Fosters Monopoly in Distribution at Retail," by Felix H. Levy; "Why Congress Should Amend the Sherman Law," by Clyde L. Eddy; "Price Standardization Awaits Amendment of the Sherman Law," by Samuel S. Dworkin, and "How You Can Help." Copies may be had for distribution at $5.00 per hundred.

THE SIXTH INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE.

The International Society of the History of Medicine holds its congress every two years. The next session will convene at Leyden and Amsterdam, July 18–23, 1927. The meetings will be held in the lecture rooms of the universities. In the communal museum at Amsterdam there will be an exhibit of paintings and old books dealing with anatomy and medicine. The general Secretary is Dr. J. E. Kroon, Stationweg 25, Leyden.

WEST VIRGINIA PHARMACEUTICAL ASSOCIATION.

The West Virginia Capsule is an historical issue, commemorating the birthday of the State Association, in 1906. In speaking of two active members of the AMERICAN PHARMACEUTICAL ASSOCIATION the *Capsule* says:

"There has always been a strong fraternal feeling between the druggists of West Virginia and their sister State, Ohio. For over two decades, there have been two Ohio druggists especially, who have given their time, their talent and ability to aiding the West Virginia State Organization. The names of these men are Dr. J. H. Beal, the Dean of American Pharmacy, and Theo. D. Wetterstroem, Secretary of The Ohio State Pharmaceutical Association. These friends assisted in the organization of The West Virginia Association, twenty-one years ago. They, along with other druggists of national fame, will be honored guests at the Deer Park meeting in June."

A group picture of those in attendance at the first annual convention is reproduced in the number referred to.

DEBATE ON "OWNERSHIP OF DRUG STORES SHOULD BE LIMITED TO REGISTERED PHARMACISTS."

A debate on above subject was decided in favor of the contestants for the negative at the School of Pharmacy, Medical College of Virginia, April 29th. The students of the latter institution gained the decision; the debaters for the affirmative are students at the University of Maryland, School of Pharmacy.

THE PHARMACIST AND THE LAW.

REPORT OF COMMITTEE ON INDUSTRIAL ALCOHOL.

Alcohol has continued to be the subject of legislation and proposed legislation, and of much controversial publicity. The denaturation of alcohol has been attacked in the public press and in the halls of Congress as tantamount to deliberate potential wholesale poisoning, and proposals for levying a tax upon it have not been wanting.

In spite of this unrest which is born of the continual controversy for and against prohibition and over the methods for the enforcement of prohibition, no very great change in the alcohol situation has taken place during the last year. The industries have kept out of the controversy that has been waged over the merits of prohibition and the degree of failure or effectiveness of its enforcement.

The proposal to tax denatured alcohol has not at any time assumed formidable proportions for the probable reason that most Congressmen who give it thought realize that such a tax would serve no good end, and on the other hand would defeat many good ends.

The agitation against certain formulas for the denaturation of alcohol, especially those involving the use of methanol, is attributable mainly to three causes: an ignorant belief that denatured alcohol without added poison would be a beverage and that poison is added by the Government to make its use as a beverage dangerous; the vote-attracting possibilities of any measure that is aimed to protect the "innocent" drinker of denatured alcohol or of illicit drinks made from it; and the vague hope that such agitation may result in changes that will make the bootlegger's work easier and the drinker's supply more plentiful and safer.

No matter what the cause of this agitation may be we must not lose sight of the fact that denatured alcohol is unmistakably unfit for beverage purposes when sold, and that if criminals improve the taste and odor so that it appears to be potable without removing any possible poisonous character the guilt is theirs. The primary reason for denaturing alcohol is not to poison it but to render it unmistakably non-potable, and the Government must insist on denaturants that are hard to remove in all denatured alcohols that are readily procurable and permitted to be used without stringent regulation.

Prohibition and industrial alcohol administration have continued under the control of the Commissioner of Internal Revenue cooperating with the Assistant Secretary of the Treasury.

On March 3, 1927, an act was passed creating a Bureau of Prohibition within the Treasury Department, the officers of which bureau shall be appointed by the Secretary of the Treasury and shall be subject to his authority. They will be charged with the Administration of the National Prohobition Act, as amended. The act takes effect on April 1, 1927. (Became effective.)

This act, which met with no serious opposition, differs decidedly from previous attempts to set up a Prohibition Bureau and which met with opposition from the industries as they were, attempts to establish a Prohibition Commissioner vested with autocratic power, some of them providing no possible means of appeal from any action the Commissioner might choose to take.

It is hoped that the arrangement provided by this new law for the administration of Internal Revenue, Customs and Prohibition matters will work for greater efficiency, but no one should be deceived into thinking that the administration of the National Prohibition Act, as amended, can be made easy matter through legislation, or by means of regulations.

Independent action by the several States on alcohol matters has probably abated that except the agitation against certain denaturants is almost sure to invite a flood of unwise measures against denatured alcohol in State legislatures.

A bill was introduced in the last Congress to increase the tariff on so-called "black strap" or waste molasses for use in distillation of alcohol to a figure that would prove to be prohibitive. This type of legislation is not economically sound as it places burdensome taxes on raw material, and this particular measure, which is apt to be brought up again in the next session of Congress, would disrupt the whole alcohol industry and seriously affect other industries, in order that some people might hope to get a little higher price for corn.

On January 1, 1927, the tax on pure non-beverage alcohol was reduced by 55 cents per proof gallon. There will be a further similar reduction on January 1, 1928, after which the

tax will be $1.10 per proof gallon where it was before the war.

MARTIN H. ITTNER, *Chairman*
RAYMOND F. BACON
J. H. BEAL
E. H. KILLHEFFER
EDWARD MALLINCKRODT, JR.
RALPH H. MCKEE
H. W. RHODEHAMEL
FREDERIC ROSENGARTEN

NARCOTIC RULES REVISION.

Regulations No. 35, applying to the administration of the Harrison Narcotic Act, are to be revised as part of the general reorganization which is going on under the new prohibition law. Administration of the law is now vested in the new Bureau of Prohibition of the Treasury Department to which it was transferred from the old narcotics division of the prohibition unit of the Internal Revenue Bureau. L. G. Nutt continues in charge with the title of deputy commissioner of prohibition instead of chief of the old narcotics division.

Mr. Nutt in discussing the revision of Regulations No. 35 said that some changes would be made in addition to those necessitated by the new law. A tentative draft of the regulations will be submitted to the interested trade association before they are fully promulgated. Several weeks will be required in the revision.

Officials of the Bureau of Prohibition are receiving suggestions with respect to the revision of Regulations Nos. 60 and 61, the former applying to intoxicating liquor and the latter to industrial alcohol.

Under the new system of numbers regulations No. 1 of the B Bureau of Prohibition will be an office manual covering various administrative details. Regulations No. 2 will be the old Regulations No. 60 and Regulations No. 3 will be the old Regulations No. 61. The new narcotic regulations have not been given a number.

One of the changes included in the new Regulations No. 3 is a liberalization of bond provisions under which a smaller bond is sufficient to cover the withdrawal of certain quantities of alcohol.

ABOLITION OF THE BUREAU OF CHEMISTRY.

Dr. Harvey W. Wiley, former head of the Bureau of Chemistry, writing in *Science,* states that "the proper way to have gone about this thing (the abolition of the Bureau of Chemistry) would have been the introduction of a bill abolishing the Bureau of Chemistry, establishing a new Bureau of Chemistry and Soils, and creating a new unit of administration for the Food and Drugs Law, with a repeal of that part of the Food Law which charged the Bureau of Chemistry with its enforcement. If this proposition had come before the Congress of 1906, which enacted the Food and Drugs Law, I doubt if it would have received an affirmative vote in either house. Numerous attempts were made during the pending legislation for the law to take the administration away from the Bureau of Chemistry, but every one of these attempts was overwhelmingly negatived. The only persons, then, who really wanted to see the Bureau of Chemistry divorced from the Food and Drugs Act were the adulterators of foods and drugs."

REGULATIONS FOR HANDLING DRUGS IN HOSPITALS.

It is not unlikely that the action taken by the Chicago Health Department was responsive to the unfortunate accident referred to in the April JOURNAL on pp. 287 and 362. The Department issued new regulations, April 15th, concerning the handling of drugs in hospitals. Each hospital is now required to post written rules, approved by the Board of Health of Chicago, in close proximity to each medicine cabinet and in the drug room to safeguard the distribution and preparation of all medicines and solutions. All drugs and stock solutions used in hospitals must be prepared under the direction of a registered pharmacist or physician and carefully labeled. All poisonous drugs must be kept separate at all times from non-poisonous drugs. All medicines shall be administered only on the written order of a physician, except in extreme emergency. The following rules have been approved by the city Board of Health:

All containers of drugs or chemicals shall be plainly labeled. So far as possible all labels on stock or solution bottles should be made permanent.

All drugs for internal administration shall at all times be kept in their respective medicine cabinets under lock and key.

Nurse shall not remove drugs from one container to another, nor make any change in labels. Have labels renewed by the pharmacist when necessary.

All poisonous drugs for internal administration shall be kept in a separate cabinet or compartment marked "poisons" in distinctive bottles or boxes plainly labeled as to contents and bearing a distinctive poison label. Non-poisonous drugs shall not be kept in a poison cabinet.

All poisonous drugs or solutions, for external use, shall be kept separate from non-poisonous drugs or solutions and shall be plainly labeled as to contents, and shall also bear a distinctive "poison" label.

When about to use any drug or solution a nurse shall read the label when she takes the container in hand, again when she removes the contents, and again when she replaces the container.

All prescriptions shall be written on the proper blank and signed by an attending physician or intern. All prescriptions for compounding shall be written on the proper blank and signed by the attending physician or intern.

All drugs or solutions shall be prepared under the direction of a registered pharmacist or physician. Nurses shall make no changes in solution except that, when a weaker solution is desired, she may dilute the original solution for immediate use only.

Sterile water for drinking purposes for infants shall not be prepared nor kept in a room used for the preparation or storage of drugs or solutions.

No drugs shall be taken from the medicine cabinets or elsewhere for administration to patients by interns, nurses or others without proper record being made.

UNITED STATES CIVIL SERVICE EXAMINATION.*

The United States Civil Service Commission announces the following open competitive examination:

INSPECTOR, ANTINARCOTIC ACT, AGENT, ANTINARCOTIC ACT.

Applications for inspectors and agents, Antinarcotic Act, must be on file with the Civil Service Commission at Washington, D. C., not later than May 31st.

*Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or the Secretary of the board of U. S. civil service examiners at the post office or customhouse in any city.

The examinations are to fill vacancies in the Bureau of Probibition, and in positions requiring similar qualifications.

The entrance salary for these positions will range from $2100 to $2500 a year, depending upon the qualifications of the appointee as shown in the examination and the duty to which he is assigned. Promotion to higher salaries may be made in accordance with the civil service rules as vacancies occur. Employees are allowed subsistence and actual necessary traveling expenses when away from post of duty on official business.

The duties of the inspectors will consist of the inspection of records of manufacturers and importers of and wholesale and retail dealers in narcotic drugs and investigations of illicit traffic therein; also those of practitioners of medicine and manufacturers and dealers in preparations exempt under the Harrison Narcotic Act, as amended by the Revenue Act of 1918 and amendments thereof approved February 24, 1919.

The duties of agents will consist of the investigation of illicit traffic in opium and coca leaves and their salts and derivatives, and the securing of evidence of such violations.

Competitors will not be required to report for written examination at any place, but will be rated on their training and experience. Competitors attaining an eligible rating on training and experience may be required to report for oral examination which will be held at points as convenient for candidates as conditions will permit.

PROHIBITION SERVICE.

There are about 2500 positions to be filled; many have been filled; the notice came too late for inclusion in April JOURNAL; the salaries run up to $6000 per annum and the positions are: Prohibition Administrator, Assistant, Deputy; Zone Supervisor, Investigator; Chief of Field Division, Associate, Inspector; Prohibition Agent, Investigator; Warehouse Watchman, etc. Examinations for these positions are held in the larger cities. Information relative to vacancies in the Bureau of Prohibition can be obtained from the U. S. Civil Service Commission, Washington. Inquiry at the Government Building in your locality and of your Representative or Senator may be helpful. We are making these suggestions, because the information came too late, as stated, for the April JOURNAL.

BOOK NOTICES AND REVIEWS.

Quantitative Analysis by Stephen Popoff, Ph.D., 2nd Edition. Published by P. Blakiston's Son & Co., Philadelphia.

The title, "Quantitative Analysis," is somewhat misleading since this work is devoted chiefly to theoretic problems. Perhaps the title "Theoretic Quantitative Analysis" would be more indicative.

The chemist, in practice, must depend largely on titles, while watching for new books, therefore it is advisable to make them as broad as possible.

Even though I were to send for this book, expecting a compilation of new methods, I would never have been "stung," for Dr. Popoff has given us something we all need, and badly at that.

The sub-title clears up all this as follows: "Theory and Practice of Modern Analytical Chemistry with Problems and Explanations of Calculations."

This work is adapted to the wants of the advanced student of Chemistry, more especially the modern Research Chemist, owing to its bearings on the latest advanced theories of physical and analytic chemistry.

Part I is devoted to the Analytic Balance, its latest refinements and mechanics—Calibration of Weights—Calibration of Volumetric Apparatus, Corrections, Special Features of Apparatus and Materials—Standardization of Acidic and Basic V. S.—Indicators. This latter subject, while treated in a thorough manner, is split into two widely separated sections. Filter Papers, Evaporation, Handling of Precipitates, Reagents and Blanks, Nitrogen Determinations, Determinations of Chlorine, Iron, Brass, Limestone, Rocks, Sodium and Potassium, etc., Oxidation and Reduction Analyses are excellent examples of the author's thorough work.

Part II.—Here the author introduces a valuable subject well worth the study of every commercial chemist, namely Errors and Computation Rules, so frequently overlooked in the haste of daily routine work. Another useful chapter embraces Fundamental Conceptions in Chemical Calculations, Errors and Computation Rules, Calculations in Neutralization, Oxidation and Precipitation Reactions, Precipitation Factors, Indirect Analysis and Problems involving Specific Gravity and Percentage.

Part III.—Theory of Analytic Chemistry. A most important subject, frequently treated in a superficial manner in many of our treatises as well as institutions turning out analysts. It seems to me that to-day we put too much stress on rapid approximate methods and ignoring precautions for accuracy. Dr. Popoff is to be congratulated on his lucid and thorough presentation of this most essential feature. Prominent among these chapters are: Precipitation Reactions, Fractional Precipitations, Special Aspects of Ionization, Solutions, Gases, Neutralization Reactions, Law of Chemical Equilibrium, Oxidation and Reduction, Conditions Leading to Nearly Complete Reactions, etc.

Part IV.—Electrometric Titrations—Conductometric Methods. Iron and Steel Analyses. An Appendix of Useful Data. The index, while ample for one familiar with the work, might be enlarged through the use of more cross references. Authors should remember that users who are unfamiliar with the book, handle subjects from a totally different angle. This work shows great care in all details, nothing too minute to be overlooked in order to insure the highest degree of accuracy. The cross references are excellent with frequent citations to original articles in the *Journal of the American Chemical Society*.

After each chapter, the author adds a series of examples and problems which afford excellent drill for the student.

The cuts represent clear, clean line drawings; it is a pleasure to get away from the old cuts so common in our older works.

The headings and sub-headings and type work are most excellent. Nothing like systematic clean cut press work which reflects much to the credit of the publisher.

VIRGIL COBLENTZ.

Palladin's Plant Physiology. Authorized Edition in English. Based on the German Translation of the Sixth Russian Edition and on the Seventh Russian Edition (1914) of the Text-Book of Plant Physiology by the late Vladimir I. Palladin, Professor in the University of Leningrad. With Additions and Editorial Notes by Burton Edward Livingston, Ph.D., Professor of Plant Physiology and Director of the Laboratory of Plant Physiology of the Johns Hopkins University, Permanent Secretary of the American Association for the Advancement of Science. Third

American Edition. With a biographic note, chapter summaries and other additions by the Editor. 174 illustrations. P. Blakiston's Son & Co., Philadelphia, 1926.

How highly this textbook is appreciated by American plant physiologists is seen in the appearance of this 3rd edition following so soon the 2nd edition. Four years is a remarkably short time for the appearance of two editions of a textbook. The third edition in general is the same as the second. It contains the same number of parts, each part has the same number of chapters, and the sequence followed in their presentation is that followed in the second edition. It is in the editorial notes and additions that improvements are noted. And the classified list of books for reference in plant physiology has been brought up-to-date. As stated above, the number of chapters is the same as in the second edition. The number of paragraphs under each chapter is the same as in the second edition with the exception of the number under Chapter IV, which has now seven paragraphs instead of six. The caption of the additional paragraph is "Oxygen absorption from the soil." The technique connected with this important problem was worked out in Dr. Livingston's laboratory. The number of text figures in the new edition has been increased by one, the new one being Fig. 84 a, a diagram of arrangement for demonstrating liquid tension by the general method of Askenasy. Little need be added here as to the value and the importance of this work, that it has been translated into German, into French, into English and now three editions of the American edition, speaks for itself. Pharmacy students do little and know little of the work outlined in this textbook, the more the pity. It is to be hoped that the time will come when the botanical side of the educational equipment of our students will receive more attention, even to the same extent as is now given the chemical side. Palladin approaches the subject from the point of view of a student of physiological chemistry, and it is the chemical side of plant physiology that is emphasized.

CHARLES C. PLITT.

The Romance of the Atom. By Benjamin Harrow. 157 pages. Boni & Liverright, New York, 1927. Price $1.50.

Dr. Edgar F. Smith states in a review of the book that "Whoever reads this little book, upon laying it down, will declare its perusal was worthwhile and most gratifying. In simple language he has been led quietly along the trail of a most profound subject and will be grateful for it. Complexities have been unfolded before him. The meaning of the atom has been made more real to him. Indeed, all interested in science must surely experience some such an impression after reading Dr. Harrow's enlightening exposition.

"And yet, the reviewer wishes the booklet had closed with Chapter XI. The tribute to Irving Langmuir, master chemist, is splendid and is merited."

There are chapters in the book on the dawn of chemistry, and on the evolution of alchemy into a science; on the function of science in modern life; on science and the origins of life; on the application of the scientific discoveries; on the scientist as a citizen. We are somewhat surprised to find that Scheele is not mentioned in the book. The last paragraph of the opening chapter dealing with transmutation of elements is quoted.

"That the heavier elements are complexes of two or more lighter elements and that the transmutation of metals is distinctly within the realm of possibility, are statements which no scientist of to-day questions. Ignoring the somewhat questionable transmutation experiment of Sir William Ramsay, no one hesitates to accept the recent work of Sir Ernest Rutherford on the transmutation of nitrogen into hydrogen, by subjecting the former to a violent bombardment of rays obtained from radium. And has not Miethe within the last year or two claimed to have transformed mercury into gold? At any rate, if nitrogen can be changed into hydrogen, why should it not be possible, sooner or later, to change one of the 'base' metals into gold?"

The book contains a number of diagram illustrations and fifteen half-tone plates. E. G. E.

Possibilities in the use of ultraviolet rays for testing various foodstuffs have been pointed out by German health scientists who recently conducted such tests with adulterated foods, the U. S. Consul at Frankfort-on-Main H. C. Claiborne, reports to the Department of Commerce. The tests were performed by the health authorities of Frankfort.

The director of the "Institut für gerichtl. Chemie und Mickroskopie," in announcing the results of numerous tests made in his laboratory by means of the quartz lamp, directed attention to the possibilities of violet rays in this important field of scientific research.